

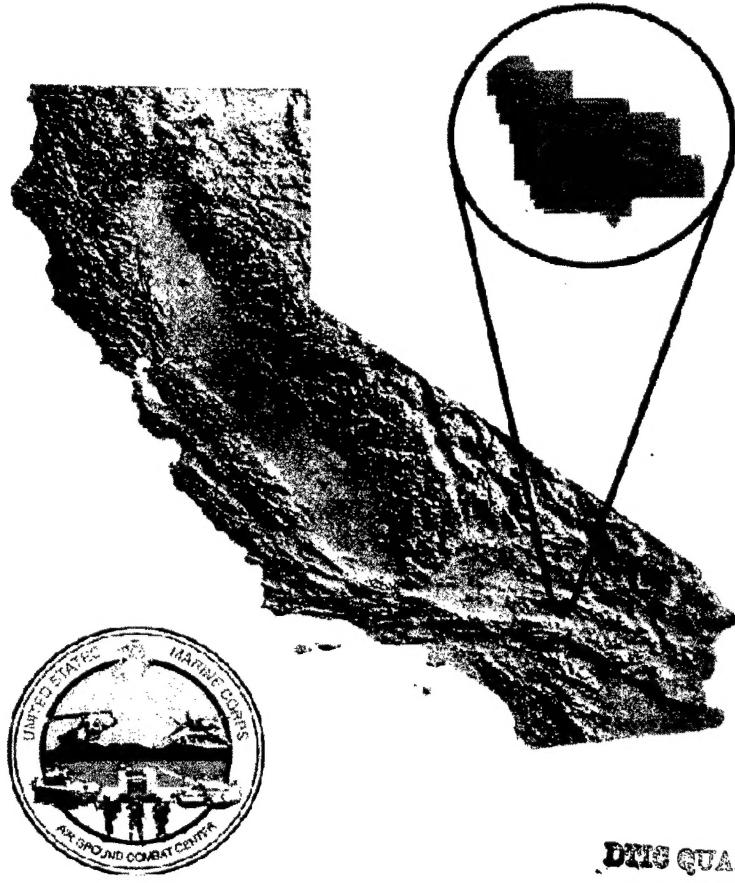
**US Army Corps
of Engineers®**

Engineer Research and
Development Center

Marine Corps Air Ground Combat Center (MCAGCC) Land Management System (LMS) Military Field Application Site FY00 In-Progress Review

by Heidi R. Howard, Dick Gebhart, and William Goran

November 2000



DIGITAL QUALITY INTEGRATED
20001211 131



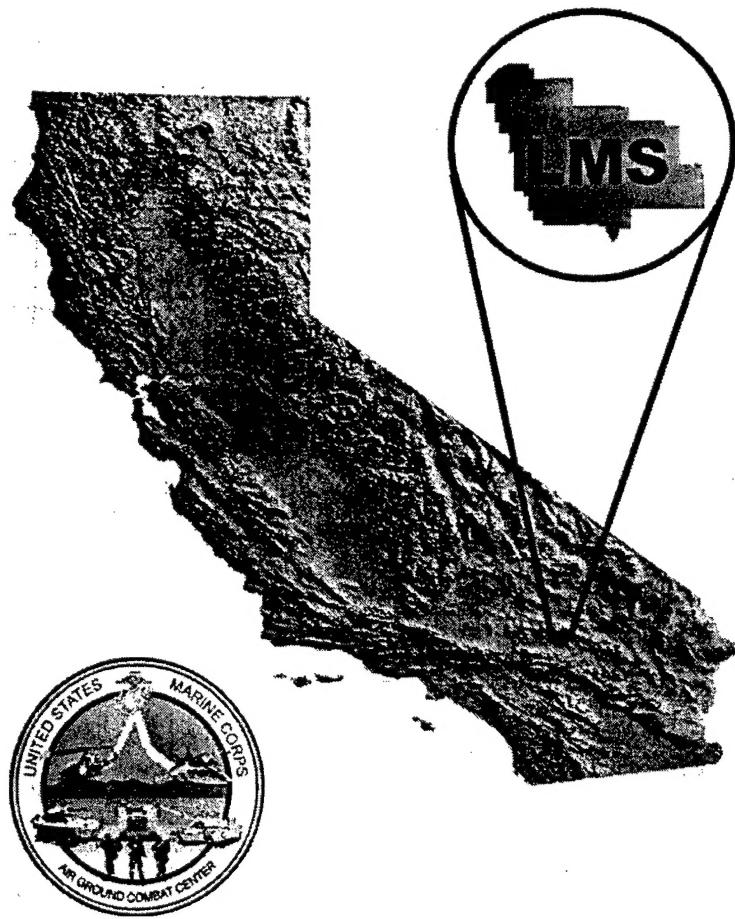
**US Army Corps
of Engineers®**

Engineer Research and
Development Center

Marine Corps Air Ground Combat Center (MCAGCC) Land Management System (LMS) Military Field Application Site FY00 In-Progress Review

by Heidi R. Howard, Dick Gebhart, and William Goran

November 2000



Foreword

This study was conducted for the U.S. Army Corps of Engineers Research and Development Directorate, which established the Land Management System (LMS) Special Project Office in March 1997. The proponents are Dr. Lewis E. Link, Director of Research and Development for the U.S. Army Corps of Engineers (CERD-Z), and Dr. Donald Leverenz, Deputy Director of CERD.

The work was performed by the Land and Heritage Conservation Branch (CN-C) of the Installations Division (CN), Construction Engineering Research Laboratory (CERL). The CERL Principal Investigator was Dick Gebhart. Part of this work was done by Heidi Howard, CERL. The technical editor was Gloria J. Wienke, Information Technology Laboratory. Robert E. Riggins is Chief, CEERD-CN-C and Dr. John T. Bandy is Chief, CEERD-CN. The associated Technical Director was Dr. William D. Severinghaus, CEERD-TD. The Acting Director of CERL is William D. Goran.

CERL is an element of the U.S. Army Engineer Research and Development Center (ERDC), U.S. Army Corps of Engineers. The Director of ERDC is Dr. James R. Houston and the Commander is COL James S. Weller, EN.

DISCLAIMER

The contents of this report are not to be used for advertising, publication, or promotional purposes. Citation of trade names does not constitute an official endorsement or approval of the use of such commercial products. All product names and trademarks cited are the property of their respective owners.

The findings of this report are not to be construed as an official Department of the Army position unless so designated by other authorized documents.

DESTROY THIS REPORT WHEN IT IS NO LONGER NEEDED. DO NOT RETURN IT TO THE ORIGINATOR.

Contents

Foreword.....	2
1 Introduction.....	5
Background	5
<i>The Land Management System.....</i>	5
<i>The LMS Field Application Program</i>	6
<i>The MCAGCC Military Field Application Site.....</i>	7
<i>LMS Field Application Program Transitions</i>	8
Objectives.....	8
Approach	8
Scope	9
Mode of Technology Transfer	9
2 Agenda for the FY00 MCAGCC LMS Military Field Application Site IPR	10
3 MCAGCC LMS Military Field Application Site IPR Attendees	11
4 MCAGCC LMS Military Field Application Site IPR Project Presentations	12
5 MCAGCC LMS Military Field Application FY00 IPR Summary of Comments and Responses.....	65
Appendix A: MCAGCC LMS IPR Letter of Invitation and List of Invitees	67
Appendix B: MCAGCC LMS IPR List of Attendees Information.....	71
Distribution.....	74

1 Introduction

Background

The Land Management System

The Land Management System (LMS) is an initiative of the U.S. Army Corps of Engineers (USACE) Engineer Research and Development Center (ERDC) focused on improving landscape analysis and landscape management capabilities in several of the Corps of Engineers major mission areas. These mission areas include the U.S. Army Civil Works Programs (navigation, flood control, water supply and quality, recreation, etc.), military installations operations and management (specifically military land management), and military engineering and terrain related operations (trafficability analysis, military hydrology, littoral operations, line of sight analysis, etc.).

The purpose of LMS is to provide relevant science, tools, and information to land and water resource managers and decisionmakers with the goal of enhancing their ability to understand and communicate past, current, and potential impacts of management actions on land and water resources. LMS was established, in part, to improve synergism in technology development across each of these mission areas, to improve USACE'S and the Department of Defense's (DoD's) ability to represent landscape processes and features, and forecast future landscape conditions, based upon alternative scenarios.

The LMS initiative had its roots in a study initiated in autumn 1995 related to modeling and simulation capabilities developed or used by the Corps of Engineers, related to landscape or geoprocesses. After this study, the Director of Research and Development, in consultation with the ERDC laboratory directors and others, decided to establish the LMS initiative.

To accomplish the goals of LMS, a Special Project Office for LMS was established, with representatives from most of the ERDC Laboratories, the Hydrologic Engineering Center of the Water Resources Support Center, and several Corps of Engineer Districts. The project director, associate directors, and the various organizational representatives comprise the LMS Development Team. Researchers throughout the ERDC laboratories (and their partners) form work teams to

perform specific tasks associated with LMS; these efforts are dovetailed into numerous existing technology programs.

Plans for the LMS Initiative are available (and updated) on the LMS website (<http://www.denix.osd.mil/LMS>) under the Defense Environmental Network Information eXchange (DENIX). For more information please see the ERDC/CERL Technical Report 99/60, *Plans for the Land Management System (LMS) Initiative* on the LMS website.

The LMS Field Application Program

The LMS Field Application Program has four major purposes:

1. To provide problem-solving and partnering relations between the Corps of Engineers scientists, technology developers, and interested and innovative landscape/natural resource managers in USACE's major mission areas.
2. To provide site-specific and problem-specific input into the design of LMS2000 functional capabilities.
3. To provide technology test environments where scientists, technology developers, and resource managers/analysts together can tackle issues, test solutions, adjust approaches, capture costs and benefits, and "demonstrate" the results to interested parties.
4. To provide a framework for planning the transfer of LMS technology to land/water resource managers, both at the sites for demonstrations and other similar sites.

Field application sites were selected based on the following criteria:

1. Interest from land/water resource managers in infusing new capabilities into their business practices, and developing collaborative partnerships with scientists and technology providers.
2. Representative land/water resources management issues — such as high levels of use, sensitive resources, competing multiple uses and stakeholders, and other problems and issues identified by user groups as important.
3. Importance of the site or problem set to the mission.

4. Support and concurrence for LMS Field Applications not only at the local level, but also from across the organizational management.
5. Synergism with existing programs/efforts.

The original sites selected for field applications were Fort Hood, TX, and in three locations in the Upper Mississippi River Basin: (1) Redwood Basin, along the Minnesota River in Southern Minnesota, (2) Pool 8 on the Mississippi River near LaCrosse, WI, and (3) Peoria Lakes, on the Illinois River at Peoria, IL. In 1999, the Marine Corps Air Ground Combat Center at Twentynine Palms, CA, was officially designated as a field application site. Currently, Fort Benning, GA, is being considered as an additional field application site.

Dr. John Barko serves as the LMS Field Application Program Director. In addition, there is a Field Application Site Coordinator for each site. Dr. Dick Gebhart serves in this capacity for the MCAGCC site. MCAGCC has one user point of contact (POC), Mr. Kip Otis-Diehl from the Natural Resources and Environmental Affairs Directorate at MCAGCC.

The MCAGCC Military Field Application Site

MCAGCC is composed of 596,480 acres (932 square miles [2414 sq km]) within the heart of the Mojave Desert, 40 miles (64 km) north of Palm Springs, CA. It was established in 1952. The desert terrain and arid climate offer prime training conditions to carry out MCAGCC's mission. The primary mission is to develop, administer, and evaluate the Marine Corps' Combined Arms Exercise (CAX) training. Annually 50,000 to 60,000 soldiers are processed through the CAX program. An additional 8,000 Marines are trained in electronic fundamentals, operational communications, air control/anti-air warfare operations, and communication/electronic maintenance at the Marine Corps Communication-Electronics School (MCCESS) at MCAGCC.

The topography and climate at MCAGCC present unique natural resource management issues. The fragile desert ecosystem is highly susceptible to impacts that in most areas are normally insignificant. The repair of these impacts through natural processes may take thousands of years. Land managers are responsible for ensuring the sustainable usefulness of training areas by minimizing impacts on plant communities, soils, water, and animal communities, and through monitoring of training impacts. Land managers need accessible tools for monitoring and predicting these impacts. Monitoring and predicting impacts on training lands will ensure safe and effective training lands for both troops and the Mojave Desert ecosystem.

LMS Field Application Program Transitions

The field application program for LMS both shapes the development of new LMS capabilities and tests these capabilities to help solve management and landscape analysis problems in the field. The field application efforts provide opportunities to test, evaluate, modify, and document how LMS capabilities help to address specific user problems and how LMS results and capabilities fit into decision processes at user sites.

Field Application Site In-Progress Reviews (IPRs) are designed to ensure that the stages of evaluation, modification, and documentation are fulfilled. These reviews also allow other interested parties to look over the shoulders of those involved at the host site and evaluate the value of applying LMS investments and results at other sites.

Preliminary contact with MCAGCC was initiated in September of 1998, followed by a letter of invitation to serve as a field application site in January of 1999. The initial LMS Needs Assessment workshop was held at MCAGCC during February of 1999 to identify and prioritize land/water resource management issues at the site. A plan was then developed and projects initiated to address these plans. This report documents the IPR, user recommendations, and post-IPR follow-up actions.

Objectives

The objectives of this IPR were to provide a forum where personnel involved with specific MCAGCC Land Management System Military Field Application projects could discuss the progress of each effort, identify the relationships between projects, and solicit input from potential users of the resulting products.

Approach

The first IPR workshop was held 13 April 2000, at the Holiday Inn - Palm Mountain Resort in Palm Springs, CA. The IPR consisted of presentations on LMS and individual projects. Following project presentations, inputs from installation personnel and others present were obtained. Prior to the meeting closure, user input was discussed and actions were defined to address each issue. Results of the IPR are documented in this report to ensure project improvements and adjustments occur and to assist with the next IPR.

Scope

The MCAGCC LMS Military Field Application IPR only addresses projects associated with the MCAGCC LMS Military Field Application. This report does not attempt to address projects and issues associated with other military and civil works LMS field applications.

Mode of Technology Transfer

This report documents the presentations and discussions of the MCAGCC LMS Military Field Application IPR. Technical concerns and unresolved issues associated with individual projects are being addressed by the project investigators on an individual project basis.

2 Agenda for the FY00 MCAGCC LMS Military Field Application Site IPR

The agenda for the MCAGCC LMS Military Demonstration FY00 IPR is provided below.

Wednesday, 13 April 2000

- 8:15-8:45 Overall LMS Introduction: Bill Goran
- 8:45-9:15 MCAGCC Introduction: Dick Gebhart
Inter-connection of projects and user requirements
- 9:15-10:15 Web-based Map Dissemination and
Data Enterprise Repository Design and Test: Kelly Dilks
- 10:15-10:30 Break
- 10:30-11:30 Wind Erosion: Ed Skidmore
- 11:30-12:00 LCTA/ITAM at MCAGCC: Liz Kellogg
- 12:00-13:00 Lunch Break
- 13:00-13:30 SERDP Remote Sensing: Paul Tueller
- 13:30-15:00 Carrying Capacity: David Price, Terry McLendon,
and Mike Childress
- 15:00-15:15 Break
- 15:15-16:00 Comment and Review
Feedback from MCAGCC POCs
- 16:00-16:45 Input from other participating organizations
- 16:45-17:00 Closing remarks, IPR conclusion.

3 MCAGCC LMS Military Field Application Site IPR Attendees

The following individuals attended the FY00 MCAGCC LMS Military Field Application Site IPR.

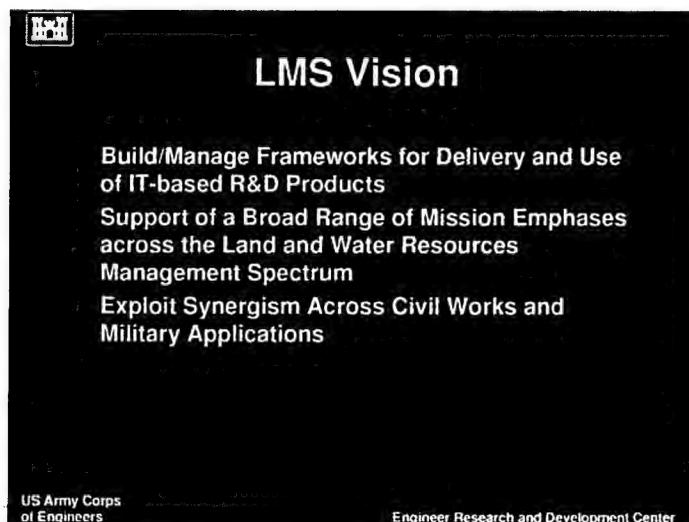
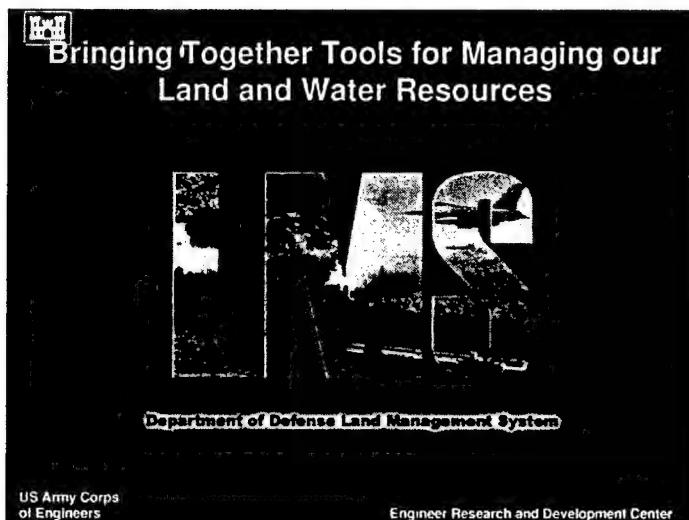
NAME	ORGANIZATION
Lorrie Agnew	MCAGCC
Mike Childress	Shepherd Miller, Inc.
Kelly Dilks	ERDC/CERL
Clarence Everly	Mojave Desert Eco. Program
Jeff Foisy	Mojave Desert Eco. Program
Tom Frank	University of Illinois
Dick Gebhart	ERDC/CERL
Bill Goran	ERDC/CERL
Heidi Howard	ERDC/CERL
Liz Kellogg	Tierra Data Systems
Richard Lawrence	ESRI
Dawn Lawson	Naval Facilities Eng.
Terry McLendon	Shepherd Miller, Inc.
Kip Otis-Diehl	MCAGCC
Val Prehoda	MCAGCC
David Price	ERDC/CERL
Doug Ramsey	Utah State University
Ed Skidmore	USDA-ARS
Ruth Sparks	Fort Irwin
Paul Tueller	University of Nevada Reno
Scott Tweddle	ERDC/CERL
Robert Washington-Allen	Oakridge National Laboratories

4 MCAGCC LMS Military Field Application Site IPR Project Presentations

The following pages provide briefing materials presented at the MCAGCC LMS Military Field Application Site IPR. Each section provides the presenter's name and the presentation materials.

PRESENTATION: The Land Management System.

PRESENTER: William Goran.



Business Approach

- Create Special Project Office (Goran, Barko, Holland)
- Build Team from Across ERDC and Corps of Engineers and Build Partnerships with other Agencies
- Develop standard practices across the partnership
- Create Resources by Horizontal Planning Across Programs, not Separate Program
- Establish Network of Field Application Sites to Involve End Users in Building LMS Capabilities

US Army Corps of Engineers Engineer Research and Development Center

Technical Approach

- On-line Catalog
- Create Catalog of computational tools
- Develop rules/protocols for interactions between tools in LMS
- LMS 2000: Build Integrating framework for land management tools
- Test Projects at Network of Field Applications Sites

US Army Corps of Engineers Engineer Research and Development Center

Status

- Published Plans Document (June 1999)
- Established Public Website (May 1999)
- Completing Version 2.0 of Tool Catalog (CERL lead, HEC, CHL, EL, CRREL Testbed)
- Established Protocol Testbeds for Level II and III (CRREL lead, ITL, CHL, EL, CERL, Rock Island Participants)
- Established Five Field Application Sites (CERL and EL lead)
- Built Initial LMS 2000 Framework (CHL & ITL leads)
- Established Academic, Industry and Agency Partnerships (Through Contracts, MOA, etc)

US Army Corps of Engineers Engineer Research and Development Center

**LMS Partnerships
(Academic and Industry)**

Through 5 Year Tasking Contract

- University of Illinois (ESRI, Menzie-Cura, Environmental Resources)
- Kansas State (Intergraph Corp, Aqua-Terr, LLC)
- Pacific Meridian
- Shepherd-Miller
- Tetra Tech (ESRI, U of I GMS Lab, Univ. of Mississippi Field Station (UMFS), University of Virginia)

Through Congressional Initiative

- Sam Houston State University

US Army Corps of Engineers Engineer Research and Development Center

**LMS Partnerships
(Agencies and Organizations)**

Through Collaborative and Partnering Arrangements

- Inter-Agency Group for Decision Support
- Open GIS Consortium
- CADD/GIS Center
- SERDP
- Army Research Office
- DOE Labs
- EPA Labs
- ARS/NRCS

US Army Corps of Engineers Engineer Research and Development Center

LMS Functional Levels

Provides

- Query archived data
- Modify/execute models
- Visualization Capabilities
- Remote and local access
- Provide collaborative tools
- State-of-the-art modeling systems
- Model calibration/verification
- Uncertainty analysis tools
- Model capabilities catalog
- Navigate to servers and download
- Archive data across the network
- Establish common data formatting
- Integrate parameter databases
- Set up user-specific problems
- Compose problem-specific models
- Develop model-to-model protocols

Manage Data

Develop Conceptual Model

US Army Corps of Engineers Engineer Research and Development Center

LMS 2000 Deliverables

LMS Version	Date to Field	Technical Capabilities	Benefits
2000	20 Jan 00	<ul style="list-style-type: none"> - Linked watershed receiving water flow and sediment transport modeling (e.g., combination of WMS, SMS, HMS with RUSLE, SMWE, SED2D) - Connectivity to NEXRAD weather radar, DTED5 - bidirectional feedback to hydrologic runoff, sediment transport through initial coupling to plant model (e.g., EDYS, IDLAMS components) - basic network-based computational framework - First generation modeling catalog and standards 	<ul style="list-style-type: none"> - Managers (range, training area, resource) can evaluate effects of impending storms and frontal activity on training/testing and project operations, and can evaluate environmental impacts of mining and project operations over short-term (days) to seasonal (months) time frames - Sets the basis for technical users to prepare for much advanced capabilities that will follow - Through partnering, sets standardized method for integrating modeling, data collection, and decisionmaking in a more holistic manner

US Army Corps of Engineers
Engineer Research and Development Center

LMS 2001 Deliverables

LMS Version	Date to Field	Technical Capabilities	Benefits
2001	20 Jan 01	<ul style="list-style-type: none"> - Link LMS modeling suite with screening-level tools - Standards for linking models in LMS modeling suite - Seamless connectivity to major GIS (e.g., ArcInfo, MGE, etc.) and meteorological and environmental databases in both local and network modes - Improved training footprint impact simulation - System output formatted for direct input to user decision support systems (e.g., ATTAC, ITAM, WCDS, demo site systems) - Basic metadata standards established - Metadata requirements published and implementation initiated for LMS modeling suite - Improved model catalog with model selection criteria and guidance 	<ul style="list-style-type: none"> - Productivity enhancement through ease of access to GIS, modeling, data - Standards for linkage of future models including user-specific models and analysis tools - Ability to use World Wide Web as an extension of local user's machine for access to remote databases, computing resources - Linkage of modeling and simulation output formats directly importable to user decision support systems - Standardized methods for data characterization, assembly, and archival - Descriptions for modeling and simulation tools themselves to empower reuse and verification - Support to users in model applicability, limitations, and selection

US Army Corps of Engineers
Engineer Research and Development Center

LMS Catalog

Level 1 – Protocol, new tool development registration process/use

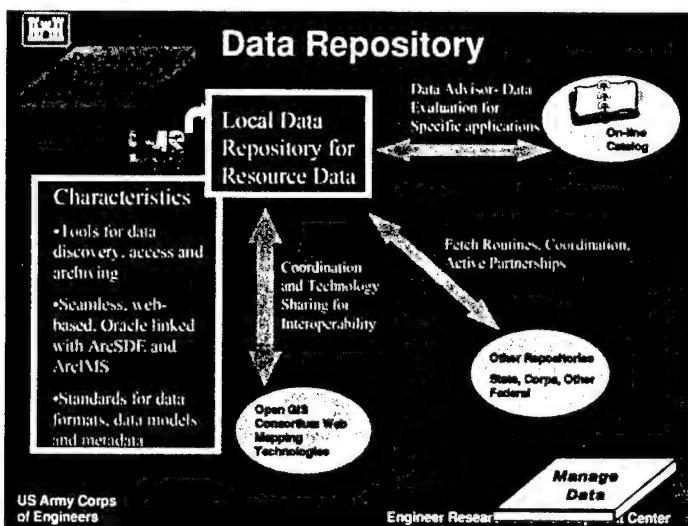
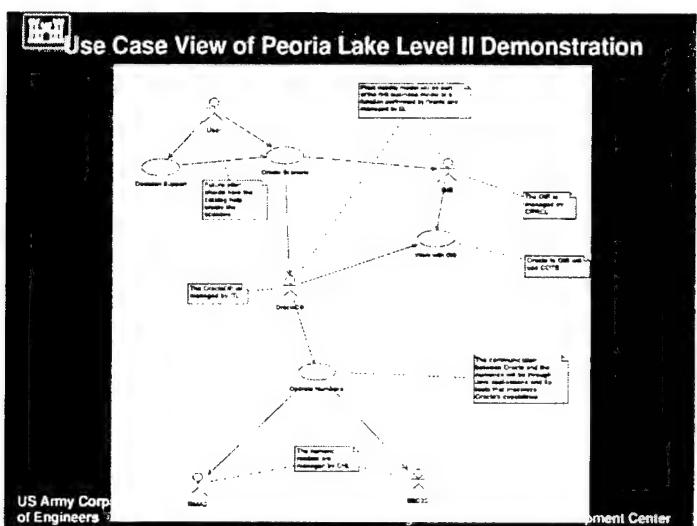
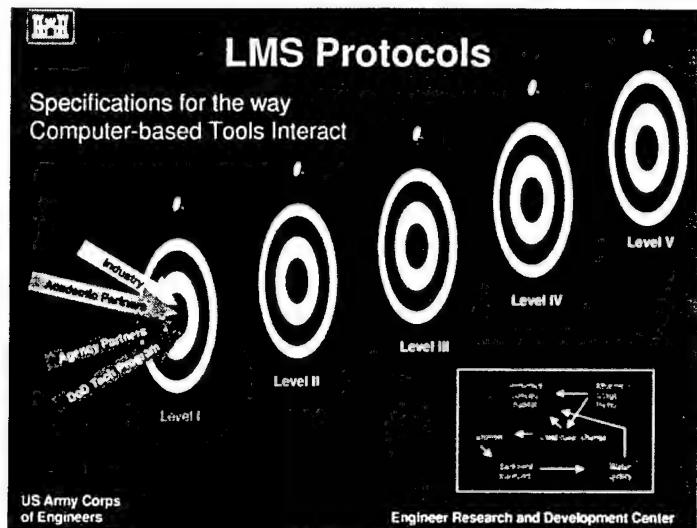
Metadata for Computing Tools – Advancing Computing Standards

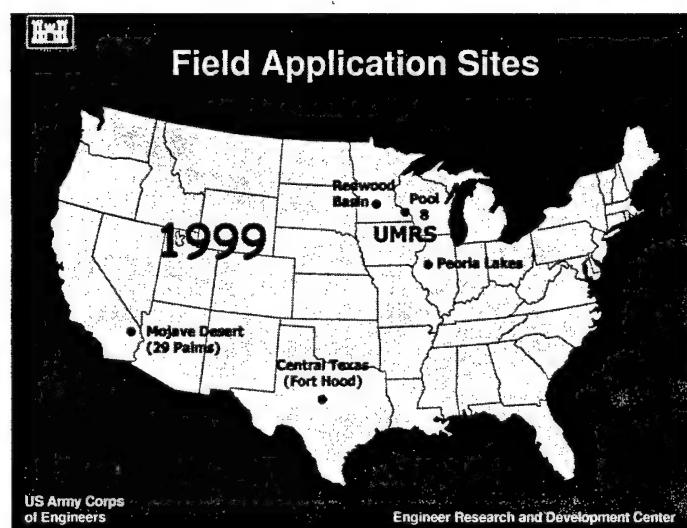
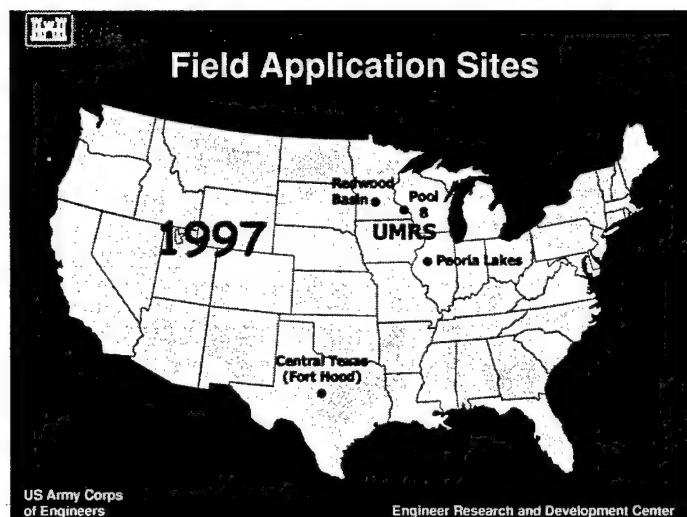
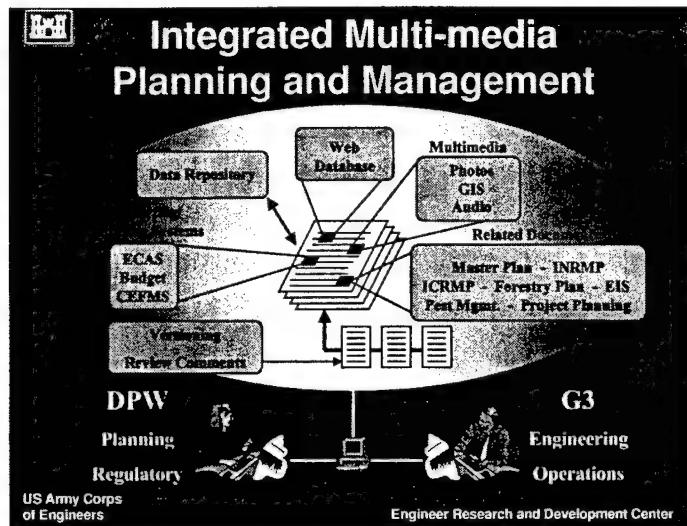
Cross-Agency Tool Sharing (facilitate sharing, collaborative investment plans)

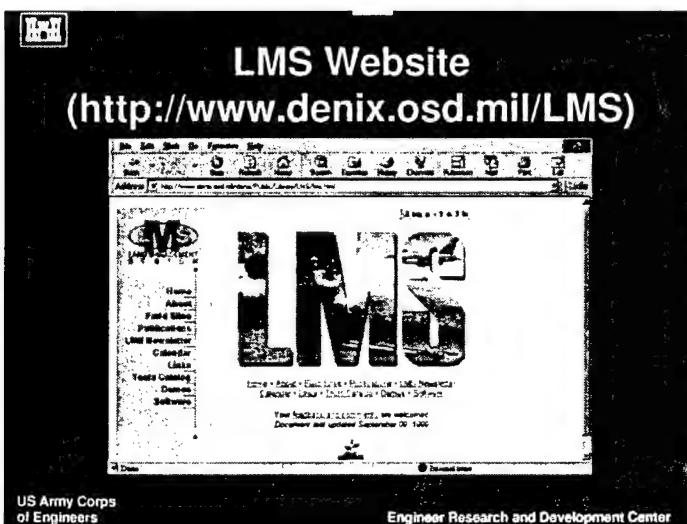
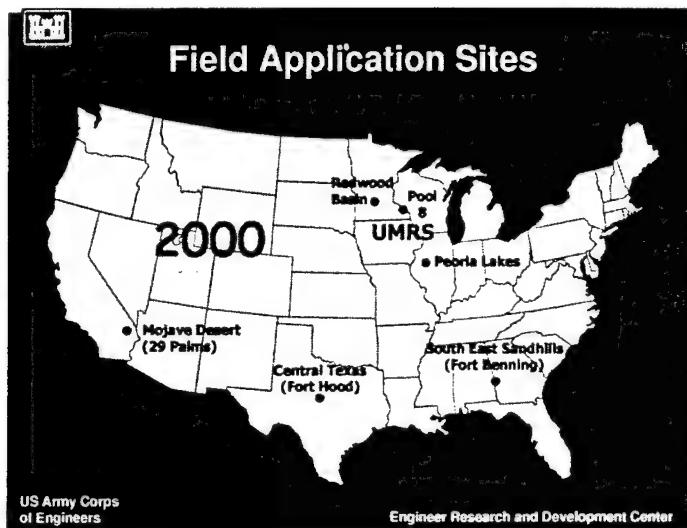
Technical Support Service Center (define scope of technical support; 1st tier support and linkages between tools)

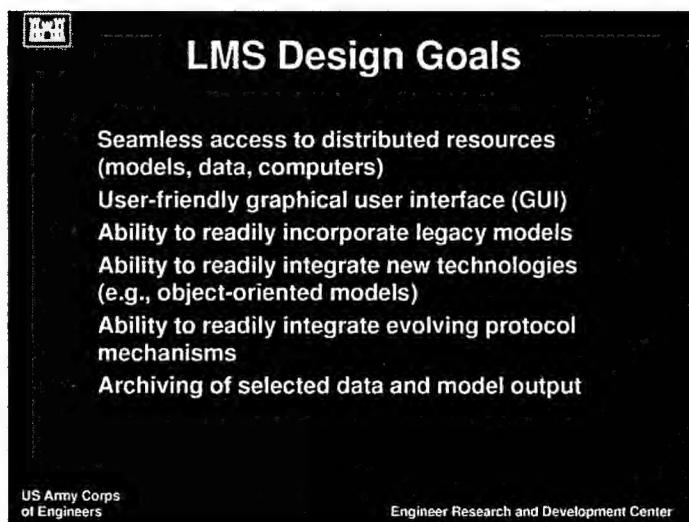
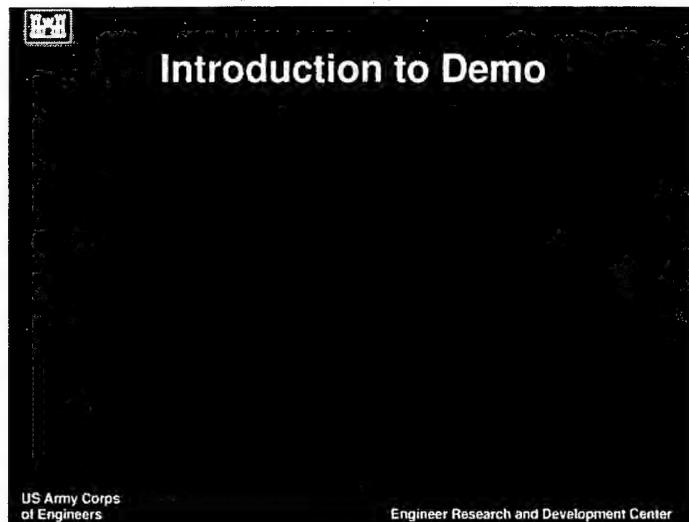
Tools Inventory for Land/Water Resource Managers (catalog advisor)

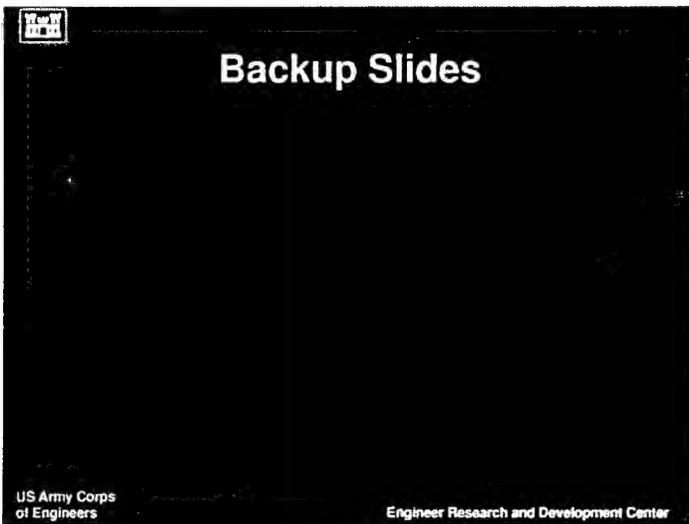
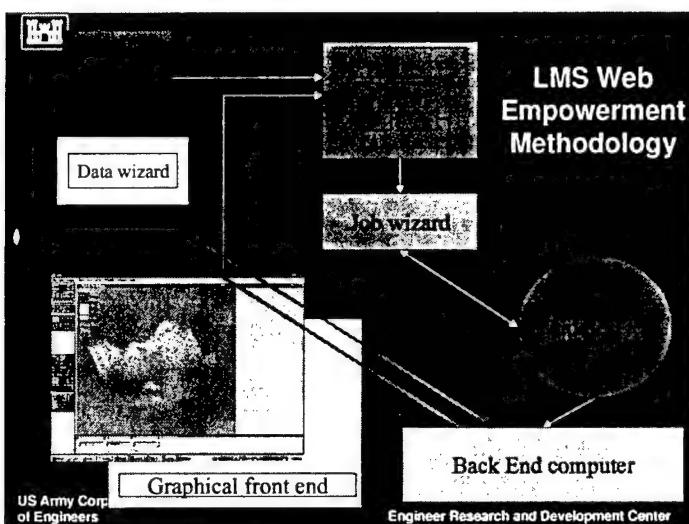
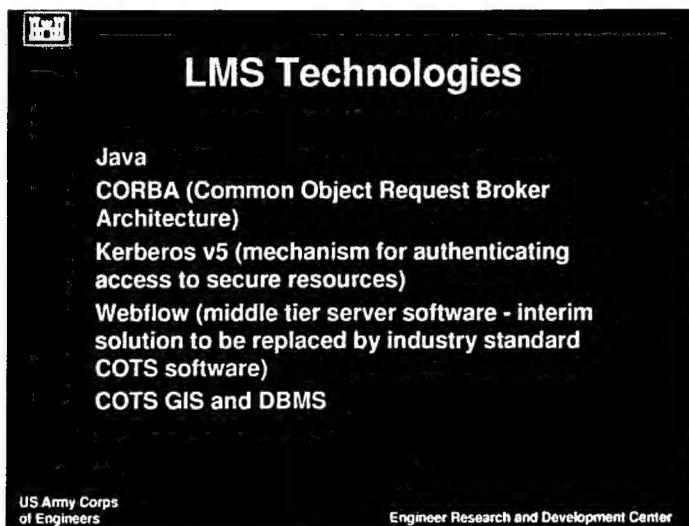
US Army Corps of Engineers
Engineer Research and Development Center











Aspects of LMS Demo

- Overview of LMS Look and Feel
- System configuration
- Web-based Features of "Manage Data" Level
- Model and Simulate Level Features
 - Example for military installation
 - Example for Army civil works project
- Capabilities of the Decision Support Level
- Near-term Fielding
- Plans for Future Capabilities

US Army Corps of Engineers Engineer Research and Development Center

LMS2001 Development Pathway

Field 1 Jan 2001

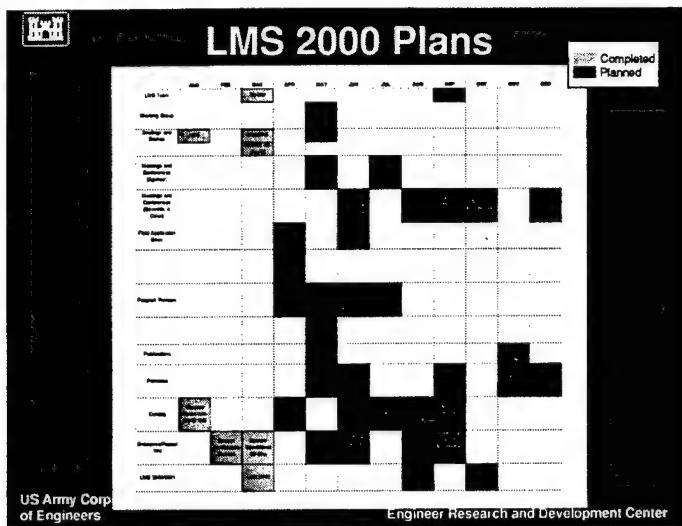
- More URLs to get data from websites.
- VRML, OpenGL capabilities within XMS series.
- Connectivity of several additional models.
- Connection to first-generation model advisor.
- Publication of initial set of protocols.
- Improved CASC2D within WMS that simulates groundwater-surface water.
- Provide flags identifying when model executions are complete on remote machines, or to query status.
- Linkage to ATTACC and WCDS.

US Army Corps of Engineers Engineer Research and Development Center

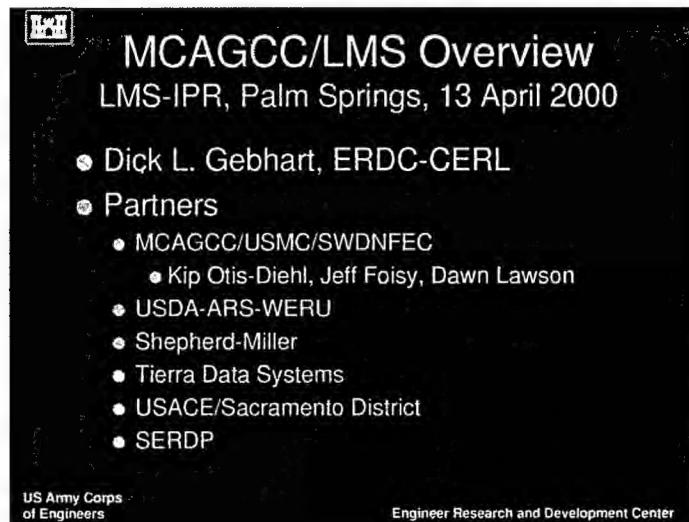
LMS2001 Development Pathway - continued

- Initial conceptual modeling environment.
- Improved training distribution modeling
- Initial decision support tools, including ability to archive model results, query them.
- Integration of several additional models.
- Complete link to OO-IDLAMS with feedback from its models to/from LMS hydrology codes.
- Ability to log into LMS data repository from non-local machine into LMS servers.
- Initial capability to manipulate key variables of calibrated/verified user model and execute.

US Army Corps of Engineers Engineer Research and Development Center



PRESENTATION: MCAGCC LMS Military Field Application Program Overview.
PRESENTER: Dick Gebhart.



MCAGCC/LMS Overview
LMS-IPR, Palm Springs, 13 April 2000

- Dick L. Gebhart, ERDC-CERL
- Partners
 - MCAGCC/USMC/SWDNFEC
 - Kip Otis-Diehl, Jeff Foisy, Dawn Lawson
 - USDA-ARS-WERU
 - Shepherd-Miller
 - Tierra Data Systems
 - USACE/Sacramento District
 - SERDP

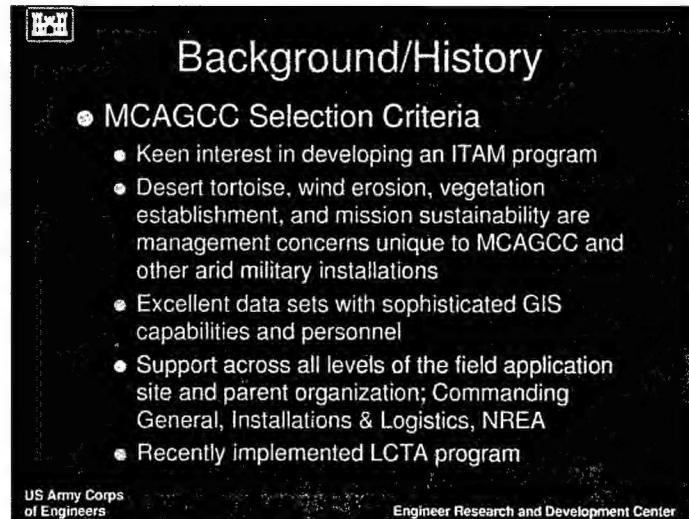
US Army Corps of Engineers Engineer Research and Development Center



Background/History

- Field Application Site Selection Criteria
 - Interest from natural resources managers in integrating new capabilities and further developing science and technology partnerships
 - Sensitive and highly visible natural resources management problems
 - Importance of site and problems to mission
 - Support across all levels of the field application site and parent organization
 - Synergism with existing programs and efforts

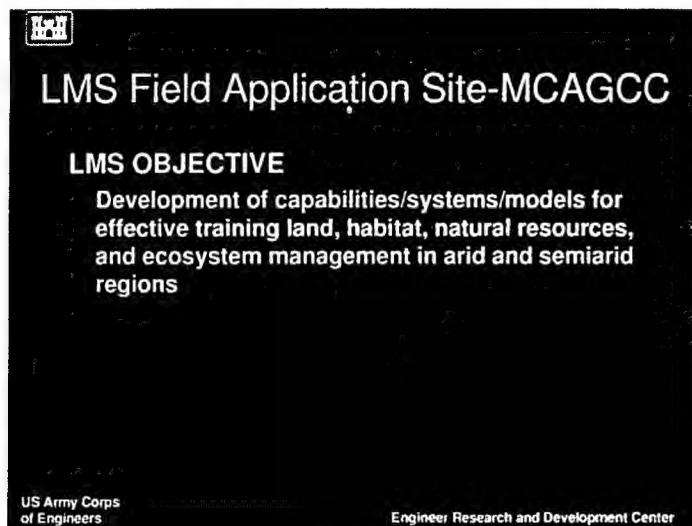
US Army Corps of Engineers Engineer Research and Development Center



Background/History

- MCAGCC Selection Criteria
 - Keen interest in developing an ITAM program
 - Desert tortoise, wind erosion, vegetation establishment, and mission sustainability are management concerns unique to MCAGCC and other arid military installations
 - Excellent data sets with sophisticated GIS capabilities and personnel
 - Support across all levels of the field application site and parent organization; Commanding General, Installations & Logistics, NREA
 - Recently implemented LCTA program

US Army Corps of Engineers Engineer Research and Development Center



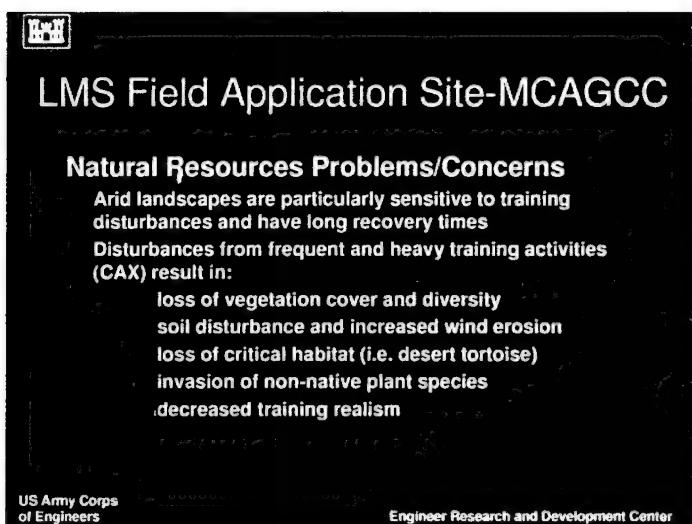
LMS Field Application Site-MCAGCC

LMS OBJECTIVE

Development of capabilities/systems/models for effective training land, habitat, natural resources, and ecosystem management in arid and semiarid regions

US Army Corps of Engineers

Engineer Research and Development Center



LMS Field Application Site-MCAGCC

Natural Resources Problems/Concerns

Arid landscapes are particularly sensitive to training disturbances and have long recovery times

Disturbances from frequent and heavy training activities (CAX) result in:

- loss of vegetation cover and diversity
- soil disturbance and increased wind erosion
- loss of critical habitat (i.e. desert tortoise)
- invasion of non-native plant species
- decreased training realism

US Army Corps of Engineers

Engineer Research and Development Center



LMS Field Application Site-MCAGCC

Natural Resources Problems/Concerns

Methods to characterize training capacity, design/adjust training use, and forecast future land conditions based on alternative training scenarios are needed to improve sustainability

Protocols for accessing, querying, and sharing GIS data among different users with different requirements are needed

US Army Corps of Engineers

Engineer Research and Development Center

LMS Field Application Site-MCAGCC

SPECIFIC PROJECTS

Land Based Carrying Capacity

- Land Condition Trend Analysis (LCTA) assessment and protocol development
- Integration of LCTA data into modeling and simulation scenarios for land use compatibility and carrying capacity analysis
- Ecological Dynamics Simulation Model (EDYS)
- Training Use Distribution Model (TUDM)

US Army Corps of Engineers Engineer Research and Development Center

LMS Field Application Site-MCAGCC

SPECIFIC PROJECTS

Land Rehabilitation and Maintenance

– Wind Erosion

- Identification of problem severity
- Identification of cultural/management practices to mitigate effects and severity of wind erosion problems
- Integration of wind erosion component into Army Training and Testing Area Carrying Capacity (ATTACC) model

US Army Corps of Engineers Engineer Research and Development Center

LMS Field Application Site-MCAGCC

SPECIFIC PROJECTS

GIS Enabling Technologies

– Web-Based Map Dissemination

- Investigate interface between Data Acquisition Model (DAM) prototype and internal web browser
- Complete interface and develop Virtual Marine Corps Air Ground Combat Center (VMCAGCC)

US Army Corps of Engineers Engineer Research and Development Center

 LMS Field Application Site-MCAGCC

RELATED PROJECTS

SERDP

- Analysis and Assessment of Military and Non-Military Impacts on Biodiversity**
- Emerging and Contemporary Technologies in Remote Sensing for Ecosystem Assessment and Change Detection on Military Installations**
- Diagnostic Tools and Reclamation**
- Technologies for Mitigating Impacts of DoD/DOE Activities in Arid Areas**

US Army Corps of Engineers Engineer Research and Development Center

 LMS Field Application Site-MCAGCC

Products From LMS Application

- Development of computer based land management models and capabilities specific to arid and semiarid regions**
- Improved LCTA protocols and ability to effectively use LCTA data in EDYS, carrying capacity simulation, and wind erosion models**
- Improved GIS map dissemination capabilities**

US Army Corps of Engineers Engineer Research and Development Center

 LMS Field Application Site-MCAGCC

Tri-Service/DoD Conservation User Requirements Addressed by Application at MCAGCC

Land Capability and Characterization #3

- Land based carrying capacity**
- Wind erosion**
- GIS enabling technologies**

Land Rehabilitation #4

- Wind erosion**

US Army Corps of Engineers Engineer Research and Development Center

 LMS Field Application Site-MCAGCC

Collaborators

- Tierra Data Systems, Escondido, California
 - Liz Kellogg
- Sacramento District COE
 - Bob Koenig
- Mojave Desert Ecosystem Project
 - Clarence Everly
- Southwest Division, Naval Facilities Engineering
 - Dawn Lawson
- SERDP
 - Dr. Robert Holst

US Army Corps of Engineers Engineer Research and Development Center

 LMS Field Application Site-MCAGCC

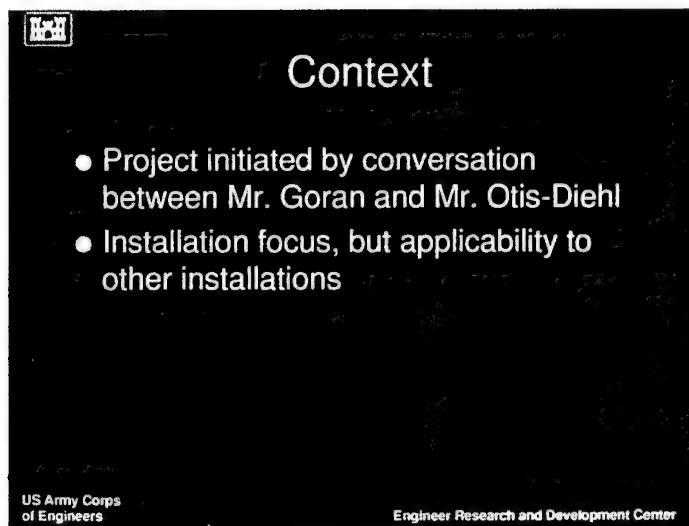
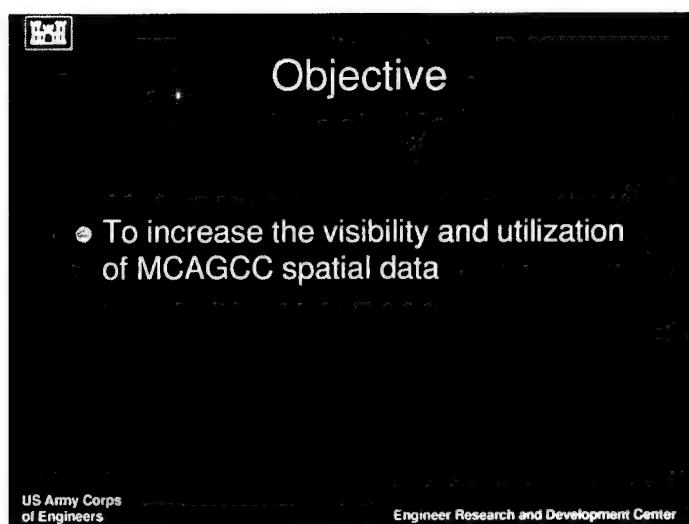
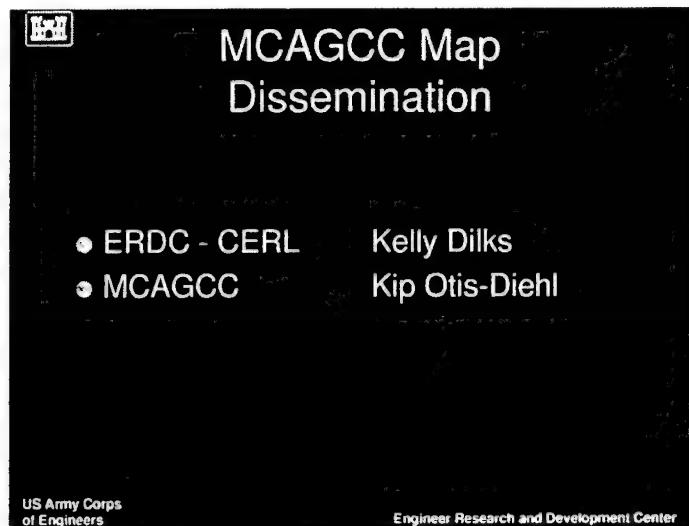
Collaborators

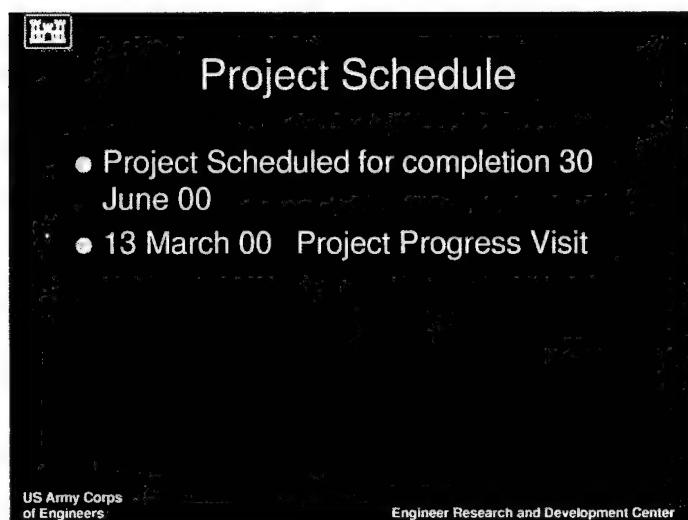
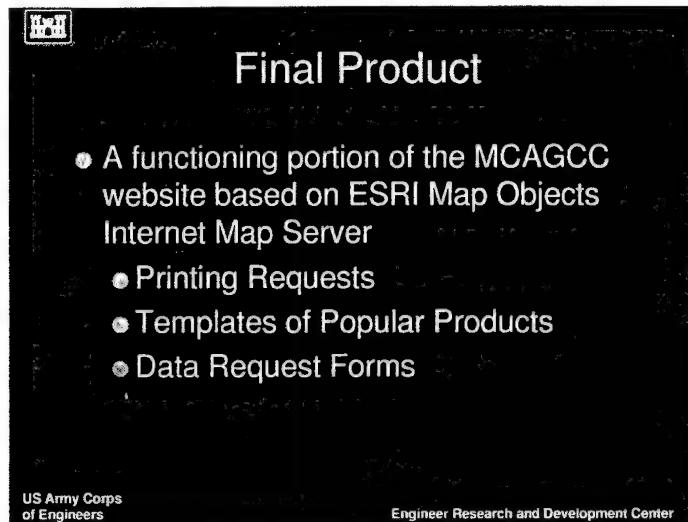
- USDA, ARS, Wind Erosion Research Unit
 - Dr. Ed Skidmore
 - Shepherd Miller
 - Dr. Terry McLendon
 - Dr. Mike Childress
- Desert Research Institute
 - Dr. Dave Mouat
- University of Nevada-Reno
 - Dr. Paul Tueller

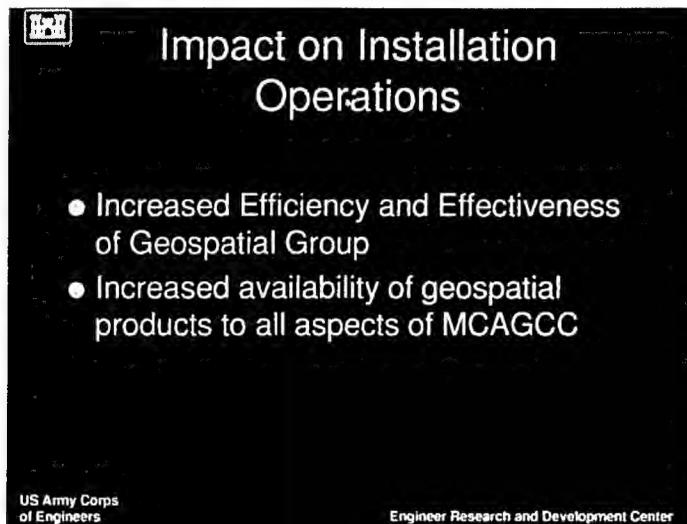
US Army Corps of Engineers Engineer Research and Development Center

PRESENTATION: MCAGCC Map Dissemination.

PRESENTER: Kelly Dilks.



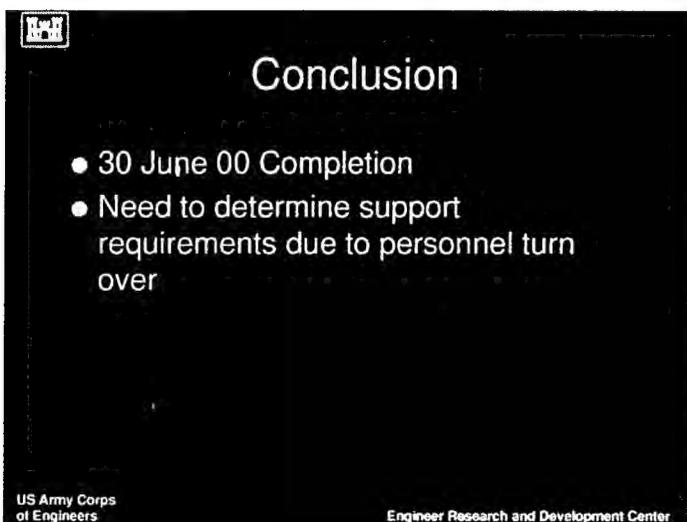




Impact on Installation Operations

- Increased Efficiency and Effectiveness of Geospatial Group
- Increased availability of geospatial products to all aspects of MCAGCC

US Army Corps of Engineers Engineer Research and Development Center

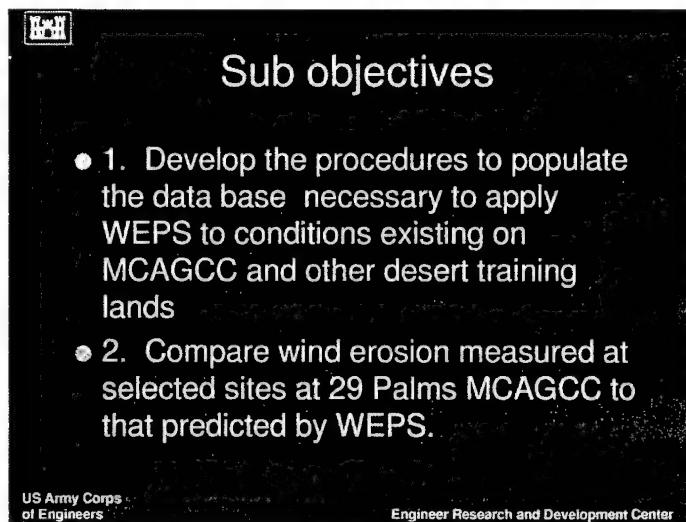
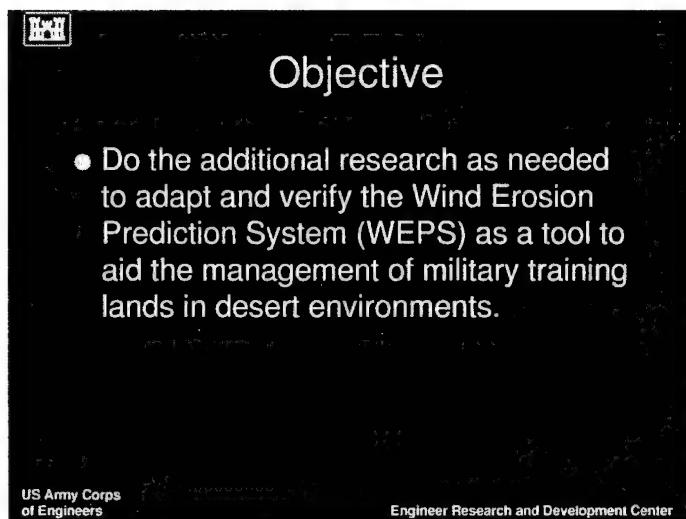
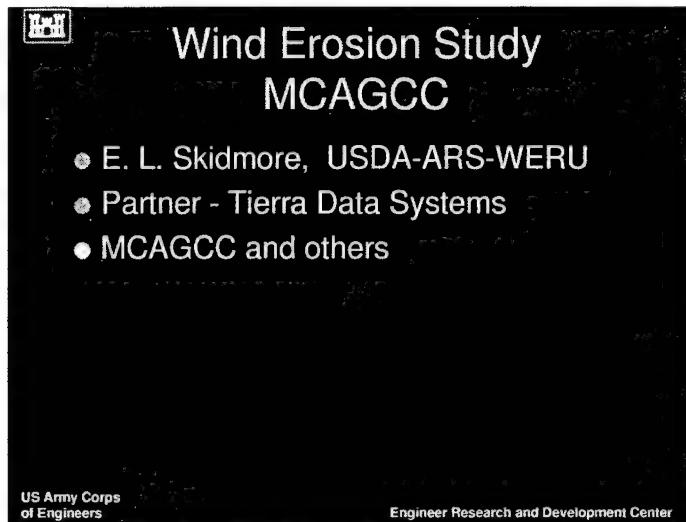


Conclusion

- 30 June 00 Completion
- Need to determine support requirements due to personnel turn over

US Army Corps of Engineers Engineer Research and Development Center

PRESENTATION: Wind Erosion Study at MCAGCC.
PRESENTER: Edward Skidmore.



Sub objectives

- 3. Determine the effect of substrate on wind erosion at MCAGCC.
- 4. Compare the saltation activity as measured by the BSNE sediment traps to the PM-10 in the same vicinity.
- 5. Determine the number of sediment clusters needed to characterize a difference at the 5% level in desert environments.

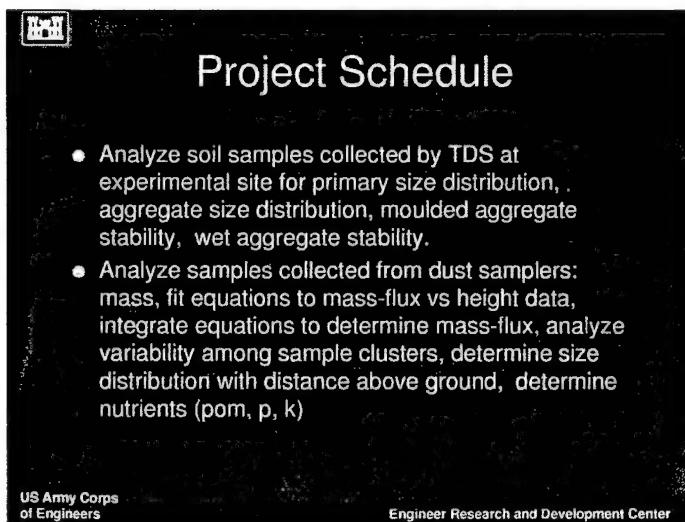
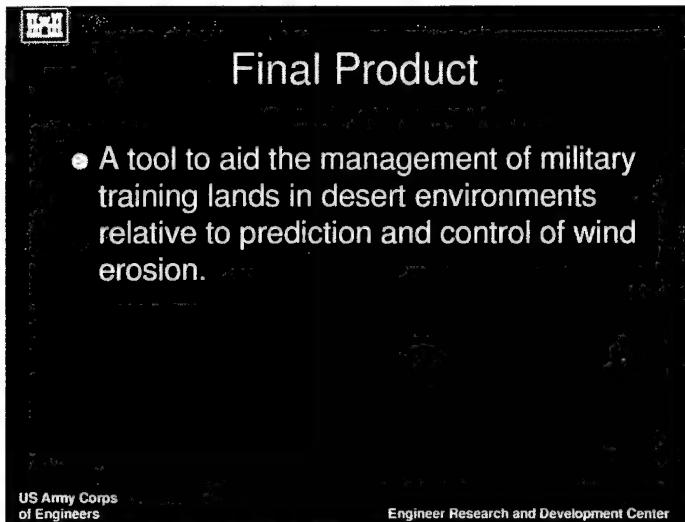
US Army Corps of Engineers Engineer Research and Development Center

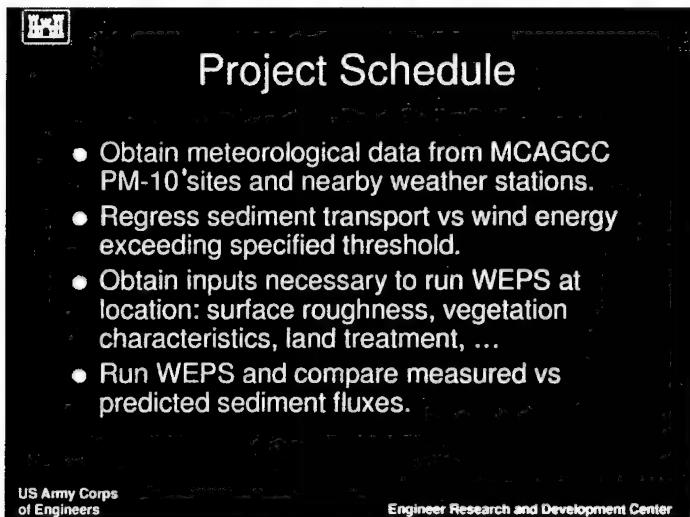
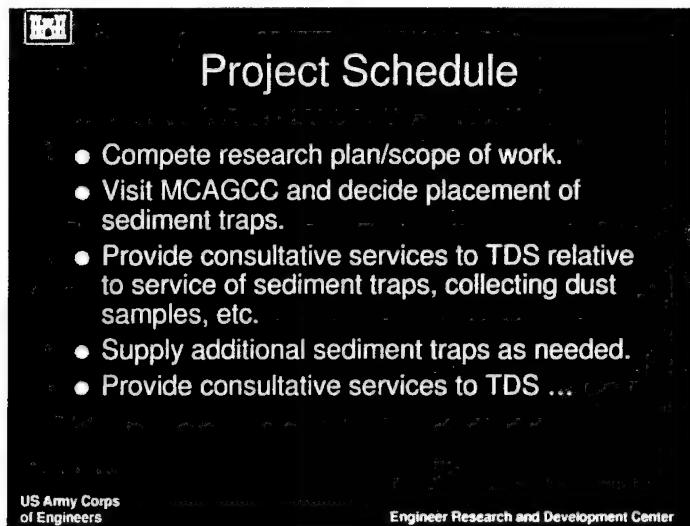
Other considerations

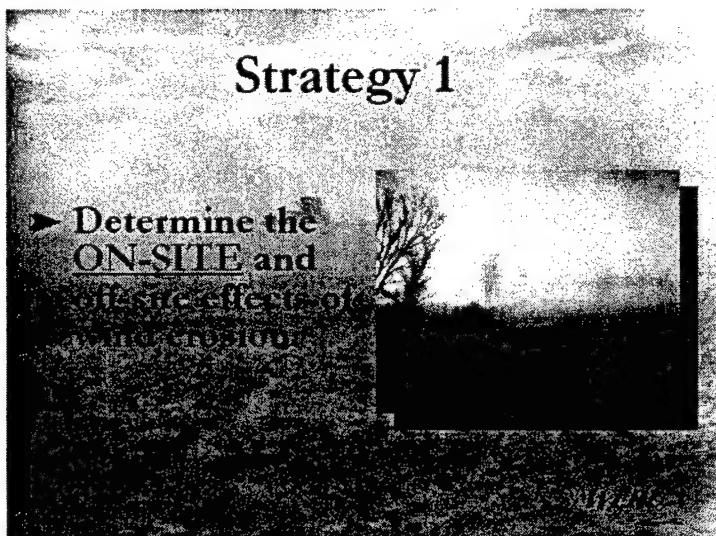
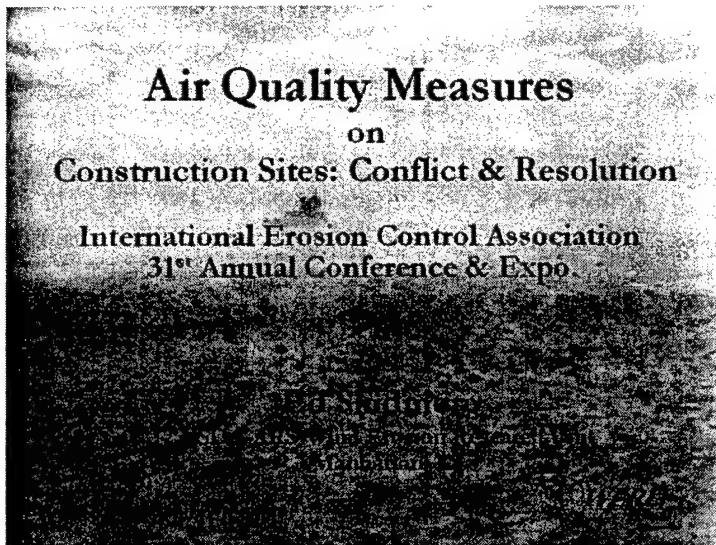
- 1. Compare the saltation activity, as measured with a device like the SENSIT, to the measured PM-10 in the same vicinity.
- 2. Compare the passive dust fallout with the measured PM-10 in the same vicinity.
- 3. Evaluate when dust becomes a safety and health issue.

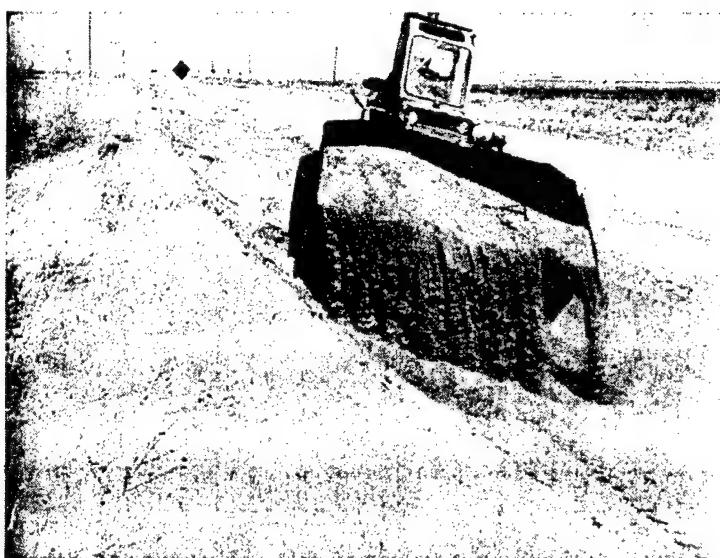
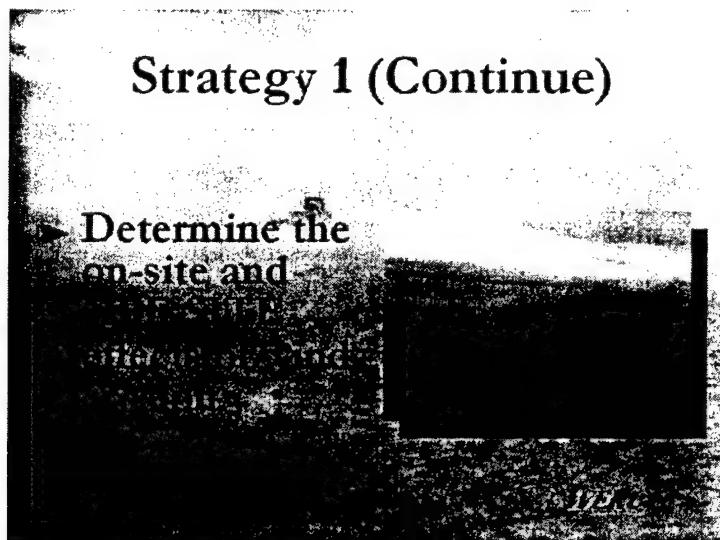
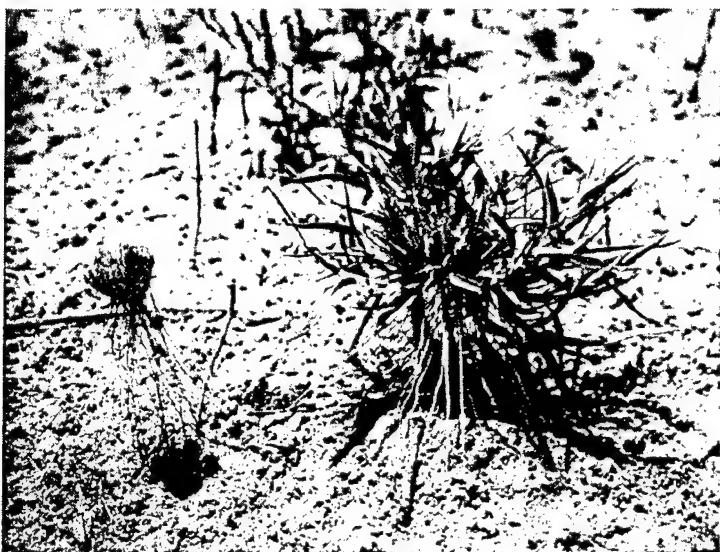
US Army Corps of Engineers Engineer Research and Development Center

US Army Corps of Engineers Engineer Research and Development Center





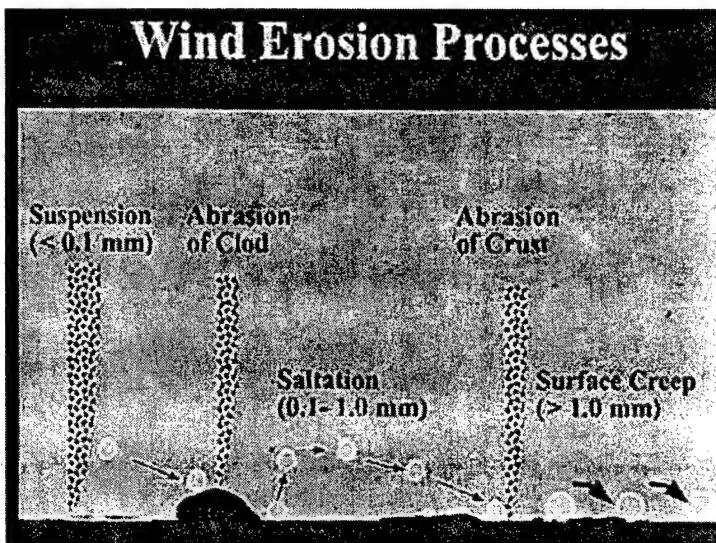


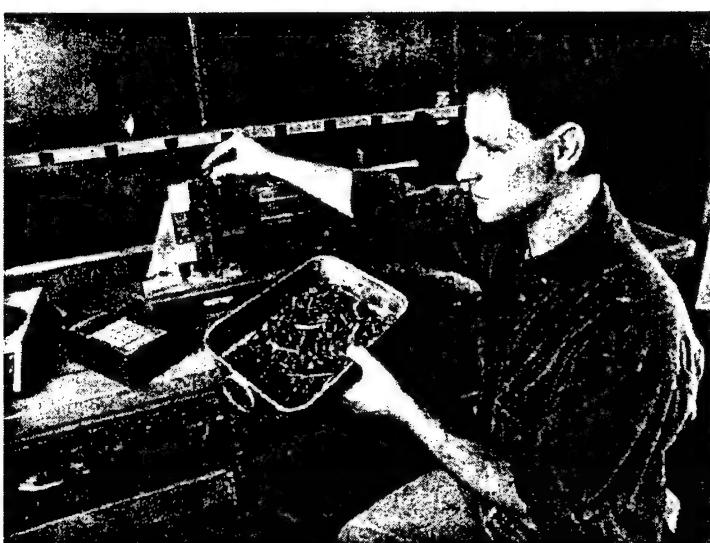
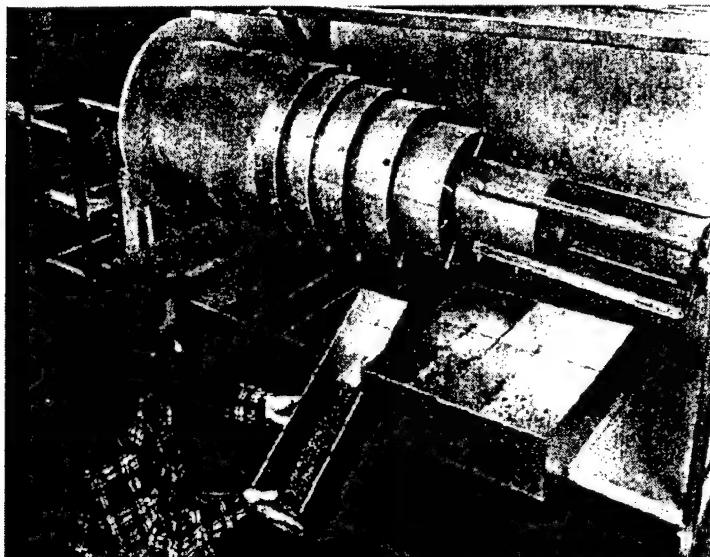




Strategy 2

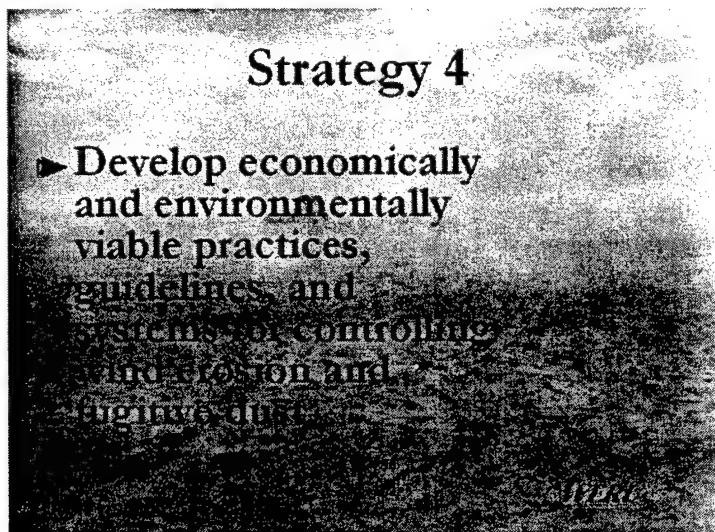
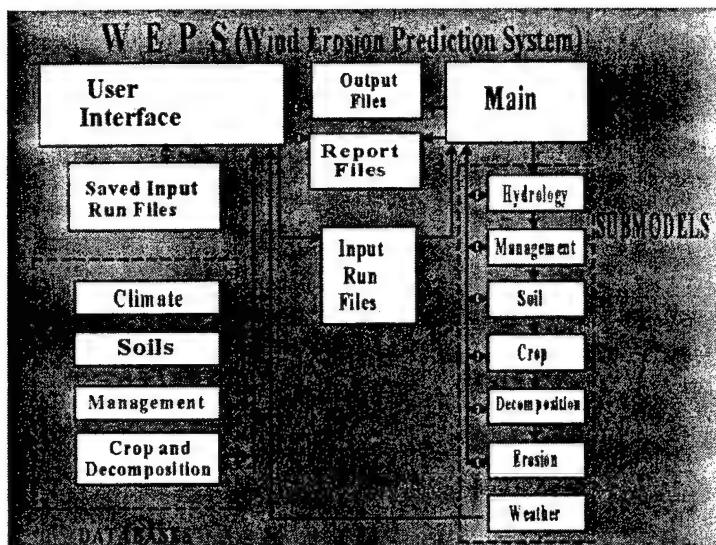
- Increase understanding of wind erosion

An inset photograph showing a person working in a dry, cracked, and dusty landscape, possibly a field affected by wind erosion.



Strategy 3

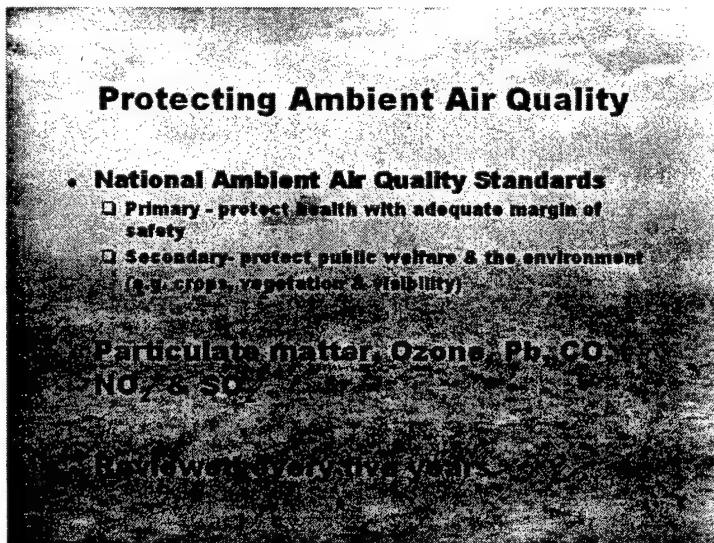
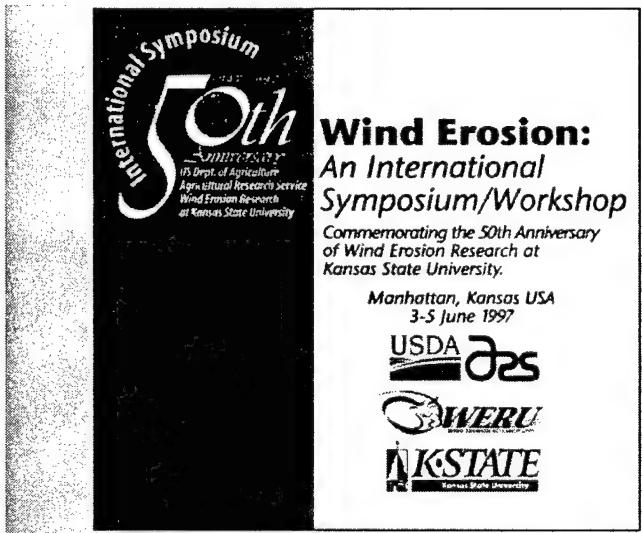
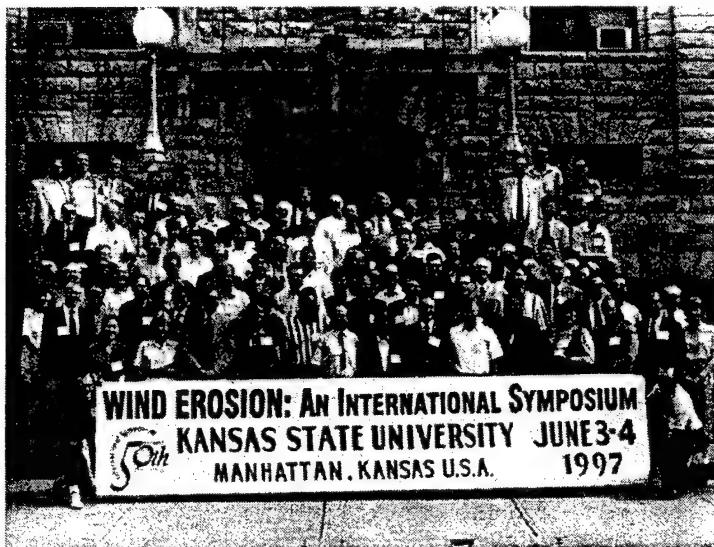
- Predict wind erosion, fugitive dust and their

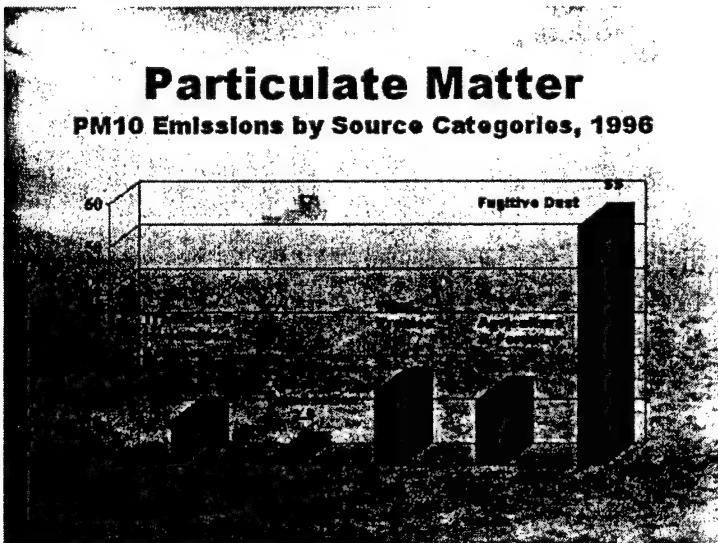
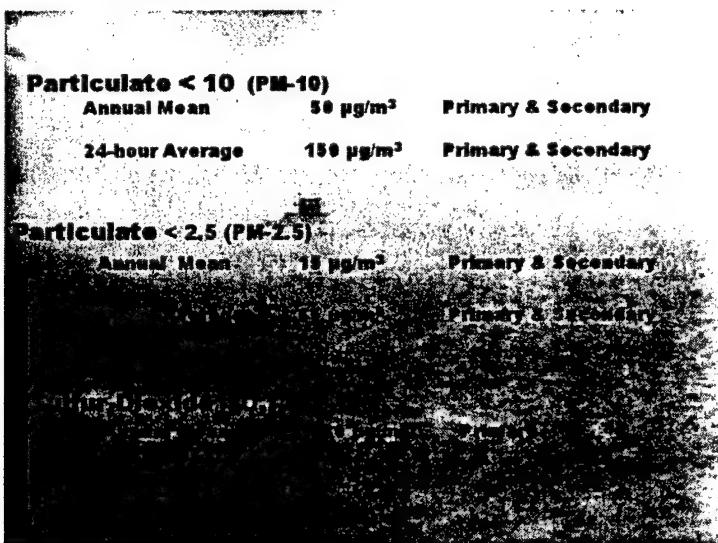
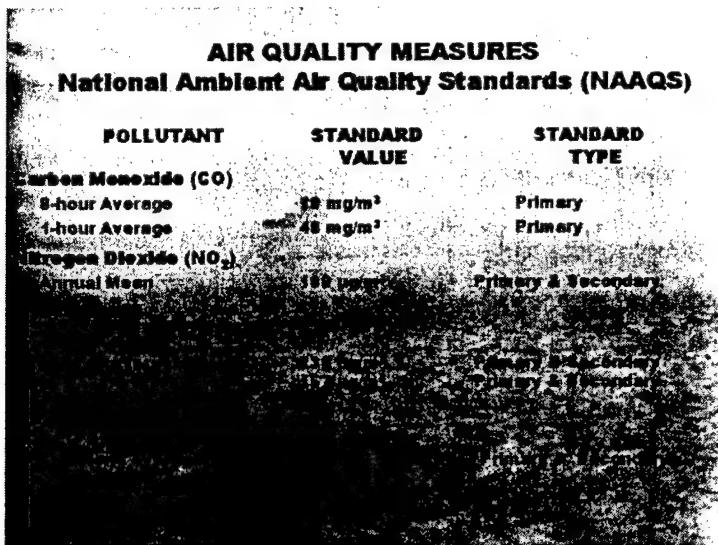


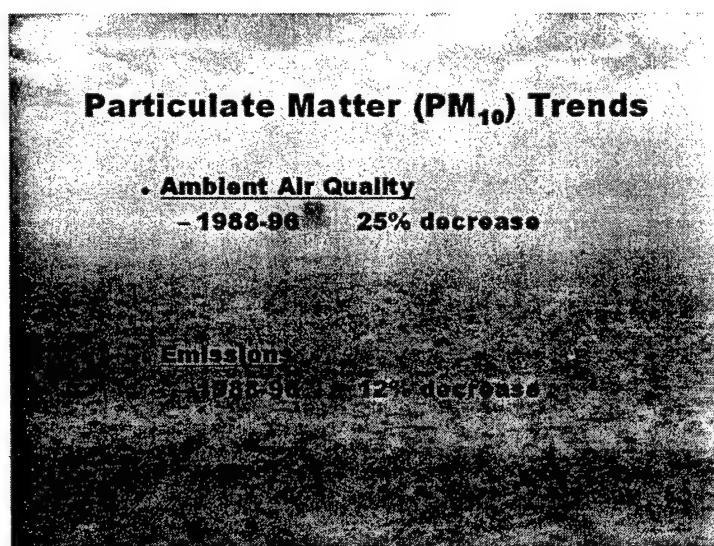
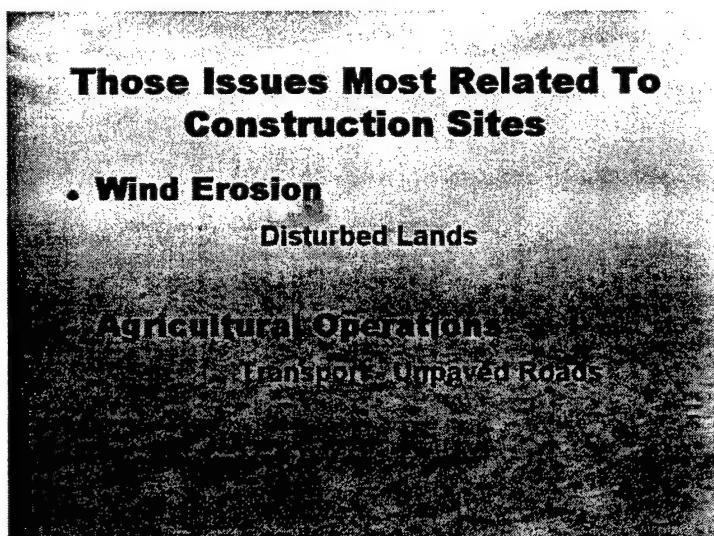
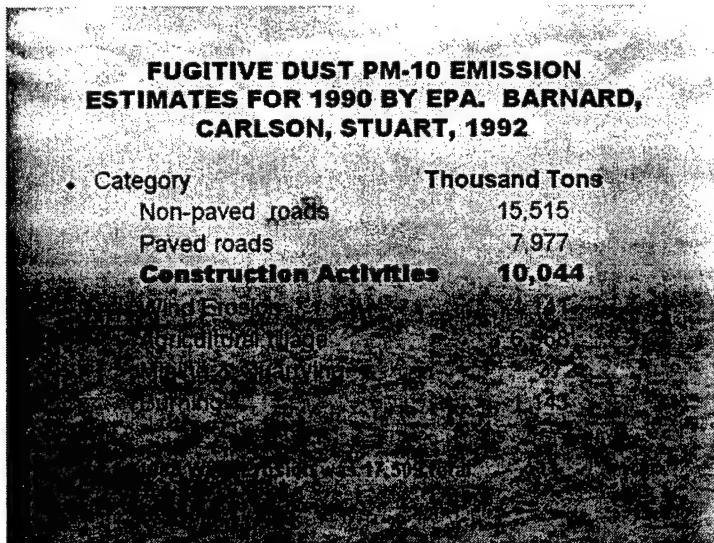


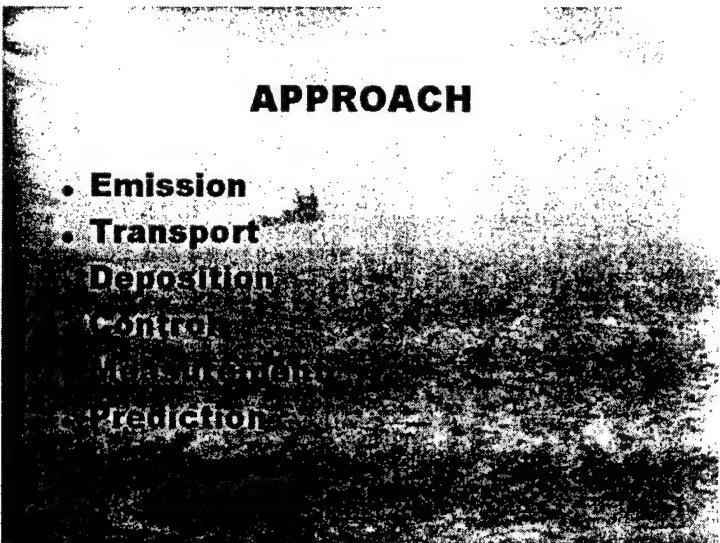
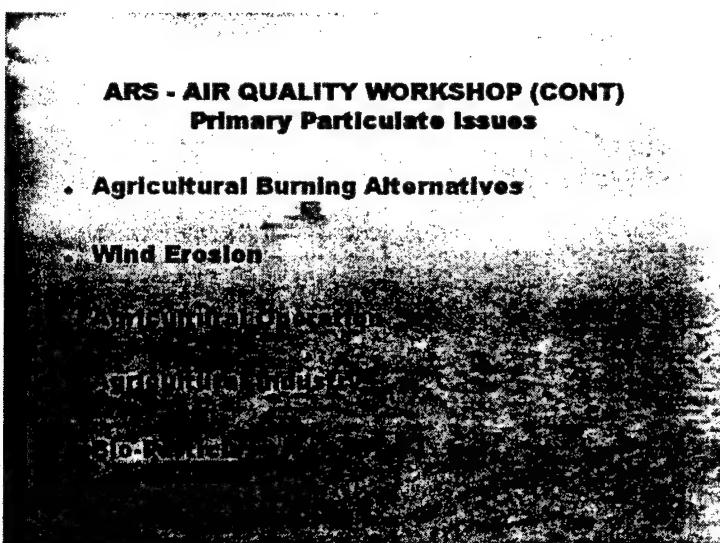
Strategy 5

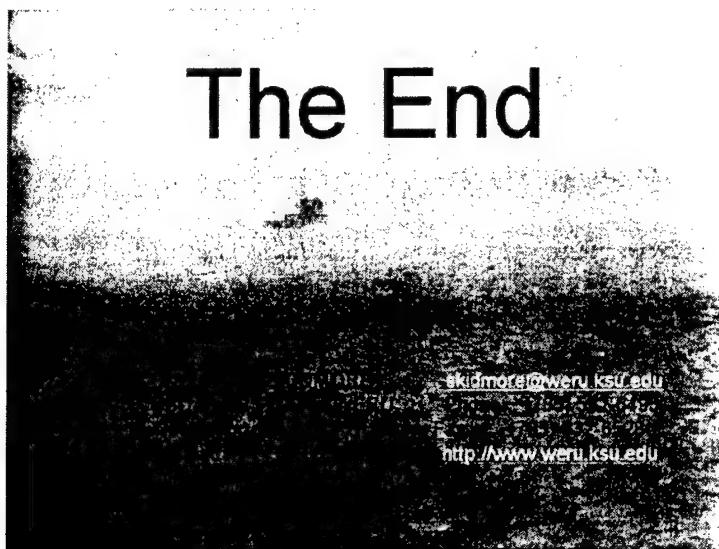
► Effectively communicate wind
strategies







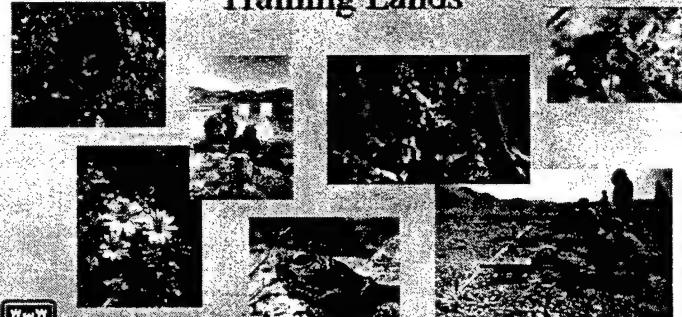




PRESENTATION: LCTA: Monitoring the Condition and Sustainability of MCAGCC Training Lands.

PRESENTER: Liz Kellogg.

LCTA: Monitoring the Condition and Sustainability of MCAGCC Training Lands



US Army Corps
of Engineers

Engineer Research and Development Center

Objectives

1. Improve understanding of the link between training activities and the erosion status of training lands.

2. Develop LCTA's use as a conservation planning tool for the long-term sustainability of training lands.



US Army Corps
of Engineers

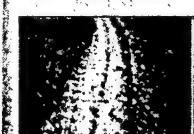
Engineer Research and Development Center

Context

1. LCTA Program initiated 1997.

2. LCTA in the desert requires a different approach to assessing trend because of long recovery times.

3. Sustainability of training lands needs to be defined in the context of this specific ecosystem, in order to be an effective conservation planning tool.

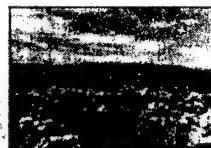


US Army Corps
of Engineers

Engineer Research and Development Center

Approach

What's different about the desert?



- » Recovery times are longer than the time scale for management.
- » Extreme events drive environmental change more than average annual events.
- » Resources are concentrated in shrub islands...water, nutrients, and diversity...and disturbance changes this.

US Army Corps
of Engineers

Engineer Research and Development Center

Approach



What's different about the desert (cont.)?

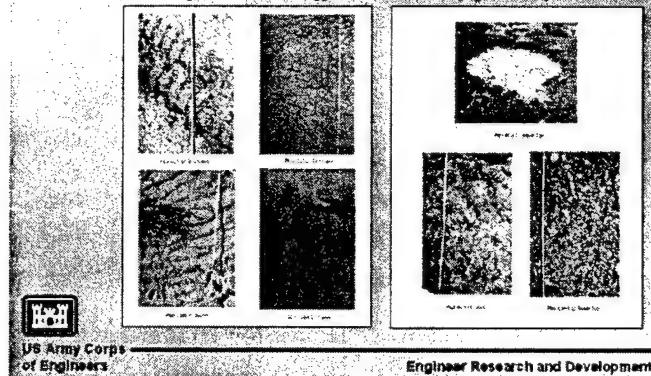
- » Cover may increase with a low amount of disturbance, but still have structural and food web simplification.
- » Soil surface condition and soil profile development affect water availability to plants...and disturbance changes this.

US Army Corps
of Engineers

Engineer Research and Development Center

Approach

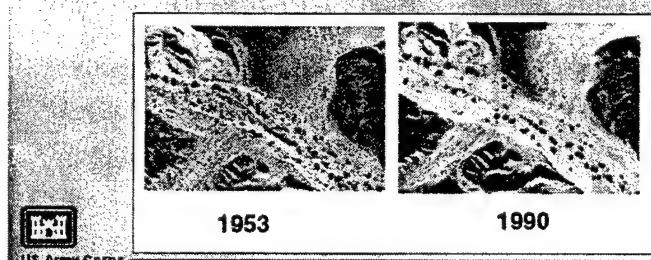
Different soil surface conditions respond differently to training, and have different recovery pathways.



Engineer Research and Development Center

Approach

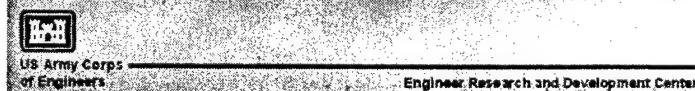
- » Build disturbance profiles.
- » Develop explanations of differences in site condition and transitions to these states.



Engineer Research and Development Center

Approach

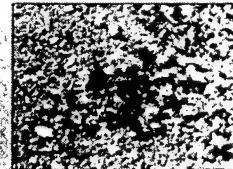
- » Long-term monitoring transects are placed along disturbance gradients, within 1 km of each other, in similar sites with respect to geology, landform, surface substrate and topographic position. This may be called "space-for-time substitution".
- » Reference (habitat) vs. use comparisons.
- » Trend over time.



Approach

Select key markers of processes that lead to site health or degradation. The current ones:

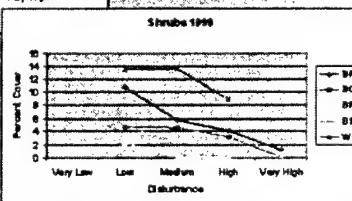
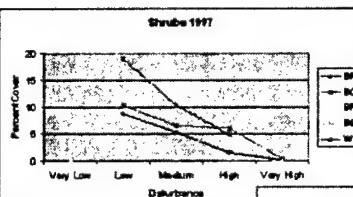
- ~ plant cover
- ~ species composition
- ~ species frequency and diversity
- ~ shrub density
- ~ rock / gravel cover
- ~ rock / gravel volume
- ~ disturbance (tracks, craters, excavations and their apparent age)
- ~ biological crust activity
- ~ soil texture



US Army Corps
of Engineers

Engineer Research and Development Center

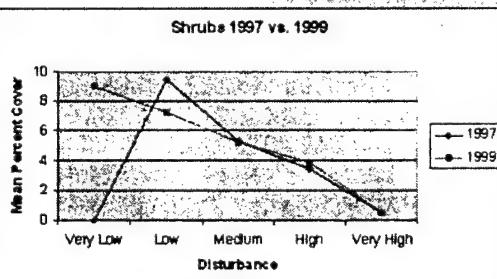
Approach



US Army Corps
of Engineers

Engineer Research and Development Center

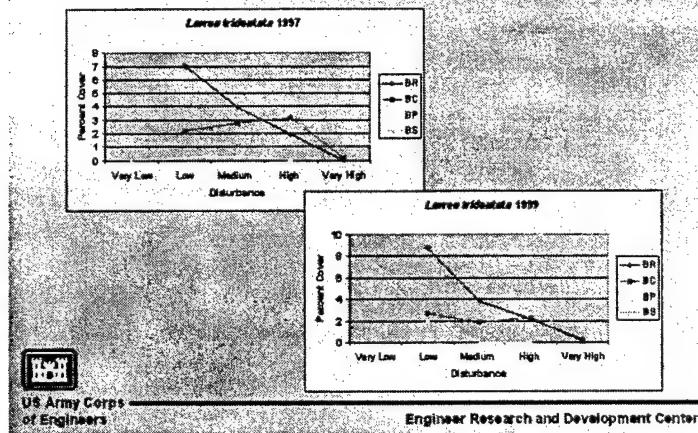
Approach



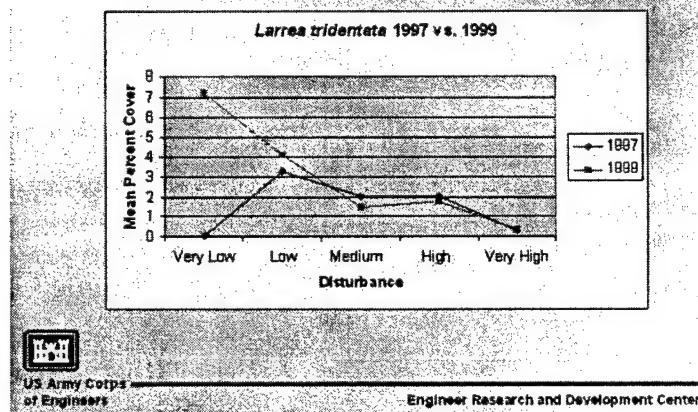
US Army Corps
of Engineers

Engineer Research and Development Center

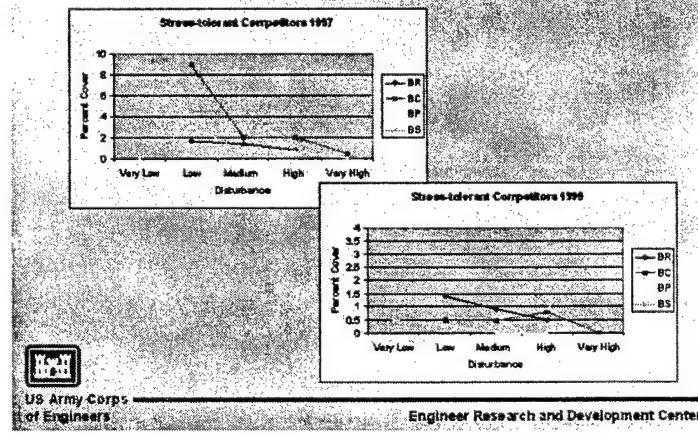
Approach



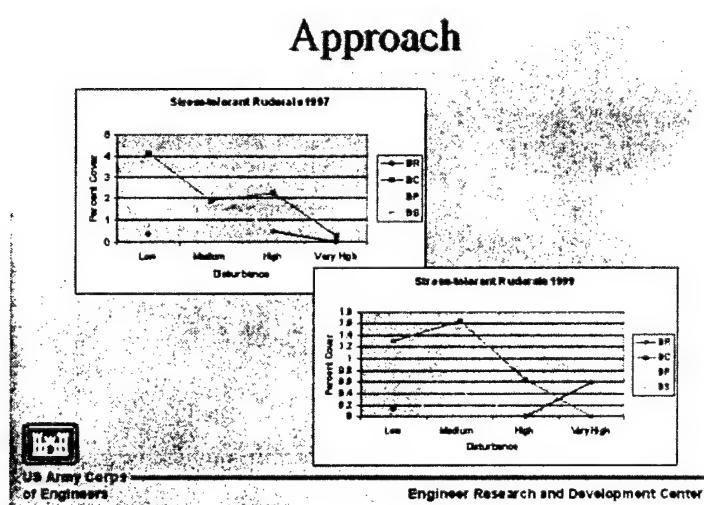
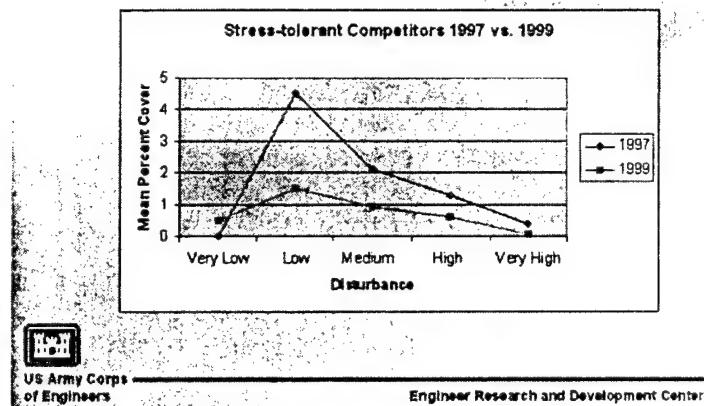
Approach



Approach



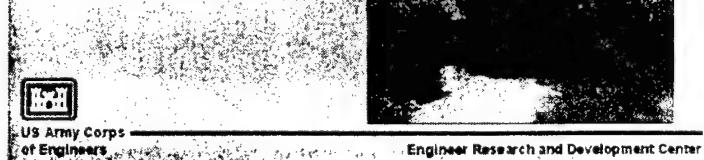
Approach



Products

Additional measures to support erosion assessment:

- » surface roughness
- » shrub shape
- » shrub density around dust collectors
- » shrub optical density
- » soil bulk density
- » soil infiltration rate



Integration

- » Dust collection samplers located near moderately disturbed plots in a range of substrates (work with USDA-ARS WERU).
- » Complements PM10/2.5 sampling program and located near those stations.
- » Supports MCAGCC efforts to describe site condition and trends, to guide sustainability planning.
- » Supports MCAGCC's efforts to determine how to extrapolate site data for Basewide planning.



US Army Corps
of Engineers

Engineer Research and Development Center

Project Schedule

- » First sediment collection complete.
- » Field work on plots begins this week.

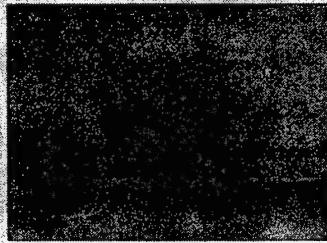


US Army Corps
of Engineers

Engineer Research and Development Center

Transition Planning

- » Sediment collections sent to WERU.
- » Field data synthesized and sent to WERU.

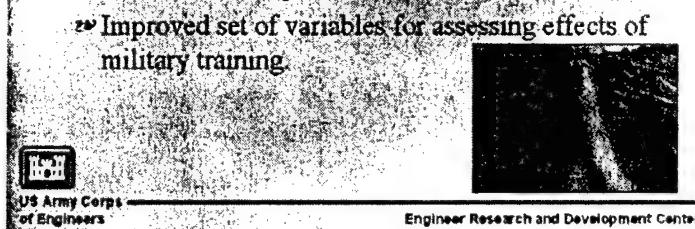


US Army Corps
of Engineers

Engineer Research and Development Center

Impact on Installation Operations

- » Improved wind erosion prediction because of link to on-the-ground disturbance and link to other factors besides soil texture.
- » Improved water erosion prediction due to data on infiltration, compaction.
- » Improved set of variables for assessing effects of military training.

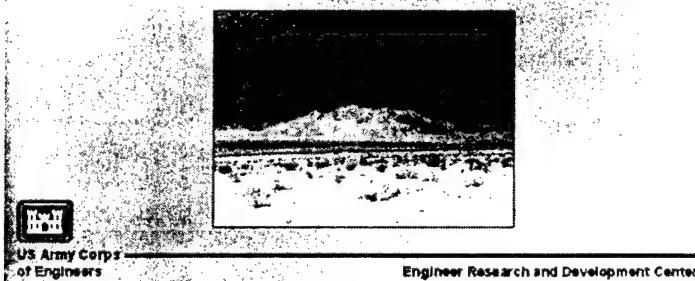


U.S. Army Corps
of Engineers

Engineer Research and Development Center

Conclusion

- » Project completion in approximately 12 months.
- » Need to develop GIS-based predictive capabilities.



U.S. Army Corps
of Engineers

Engineer Research and Development Center

Recommendations

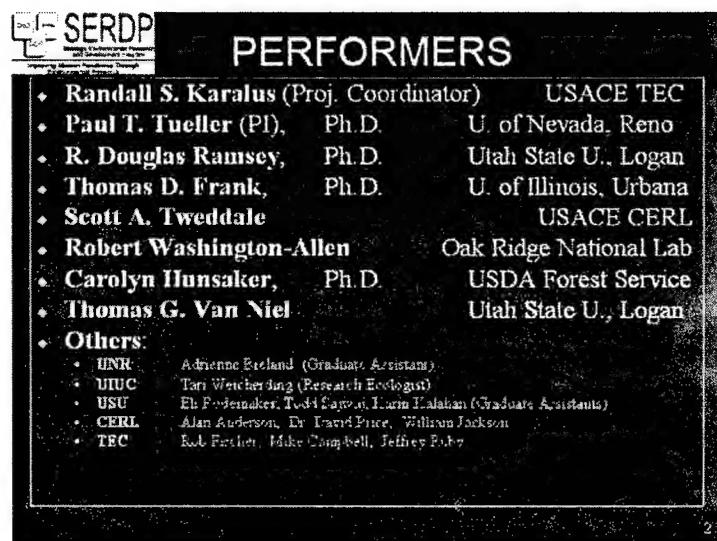
- » Develop link to NRCS ecosite mapping units and % cover of coarse fragments from Soil Survey.
- » Separate compliance versus sustainability concerns.

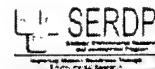


U.S. Army Corps
of Engineers

Engineer Research and Development Center

PRESENTATION: Emerging and Contemporary Technologies in Remote Sensing for Ecosystem Assessment and Change Detection on Military Reservations.
PRESENTER: Paul Tueller, Doug Ramsey.





PERFORMERS (continued)

Camp Williams (ANG): Directorate of the Environment

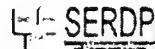
Dr. John Crane	(Environmental Director)
Maj. Bob Dunton	(Environmental Officer)
Mr. Doug Johnson	(LCTA Coordinator)
Mr. Joel Godfrey	(Fire Ecologist/Fuels Management)

Fort Bliss (Army): Directorate of the Environment

Dr. Keith Landreth	(Chief, Conservation Division)
Kevin von Finger	(Senior NEPA Ecologist)
Dallas Bash	(GIS Manager)
Brett Russell	(Senior NEPA Ecologist)

Twentynine Palms (MCAGCC - USMC)

Paul "Kip" Otis-Diehl
Valerie Prehoda
Rhys Evans
Jeff Foisy



TECHNICAL APPROACH

Ecotone and Disturbance Gradient Analysis

Investigators:
UNR, UIUC, CERL, TEC

Goals: Spatial/Spectral

Assess high resolution systems to identify the sensor attributes necessary to monitor changes in plant species composition along disturbance gradients and plant successional stages.

Calibration of scales to allow extrapolation over larger geographic regions.

Retrospective Analysis

Investigators:
ORNL, USU, TEC

Goals: Temporal/Spectral

Establish ecological history in relation to land use to describe how activities affect ecosystem and landscape response and recovery, i.e., resilience.

Identify the range of variation in the characteristics of disturbances associated with a landscape.

Determine the existence of thresholds in response and recovery to natural and DoD activities.



TECHNICAL OBJECTIVES

Overall Objective:

Develop a remote-sensing based protocol for use by land managers to monitor and assess the impacts of military training activities on their landscapes.

✓ *What is the 'Condition' and 'Trend' of selected military facilities in regards to remotely sensed indicators?*

✓ *What type of vegetation/soil parameters, successional dynamics, and related processes are detectable by remote sensing at different spatial, temporal, and spectral scales.*

Overall Approach:

Determine the temporal, spatial, and where possible, the spectral scales at which indicators of change relevant to land managers can be detected.



TECHNICAL OBJECTIVES

Stratify the landscape of individual military ranges using contemporary and emerging remote sensing technologies.

Identify the fundamental vegetation and soil attributes of military ranges as they relate to plant succession, carrying capacity, habitat management, and land resources.

Identify the spatial, spectral and temporal attributes of remote sensing systems necessary to identify ecotones.

Establish ecosystem response and recovery in relation to disturbance (land use) through retrospective studies with spatially-explicit spectral-based indices.

Develop methods for scaling through multi-resolution imagery.



TECHNICAL BACKGROUND

This research is designed to develop reliable remote sensing techniques to relate ecological concepts of:

- carrying capacity (EDYS → ATTACC → LMS),
- vegetation dynamics,
- species diversity
- critical thresholds,
- habitat fragmentation,
- ecosystem response and recovery,
- land degradation, and
- native plant community vigor

to ecological endpoints.



TECHNICAL BACKGROUND

(continued)

Ecological endpoints can be more specifically defined in terms of the following:

- Changes in plant species composition;
- Decrease in plant productivity;
- Reduction in soil quality;
- Accelerated soil erosion; and
- Changes in landcover and pattern that affect ecological function.

Spectral indicators derived from these endpoints measure the response to training activities on military installations.

FIELD DATA
Integrating field and image analysis

Canopy Structure
Relationships between spectral measurements from airborne and in-situ sensors, and, plant canopy structure and foliage density.

CAMIS Imagery

Vegetation Transects

Field Spectra

Foliage Density

Spatial Scaling and Analysis

Woods Canyon, MCAGCC, California

Landsat TM - 1 meter fused image

Landsat TM - 30 meter

Area of enlargement

Fusion of 1m digital orthorectified imagery and contemporary satellite imagery to enhance spatial properties, while retaining spectral properties. Potential applications: vegetation classification, scaling across larger geographic regions.

SERDP

DELIVERABLES

Ecotone and Degradation Gradient Analysis

- ◆ Protocols for spatial change detection.
- ◆ Methods for scaling through high and low resolution data sets for change detection over large geographic extents.
- ◆ Remote sensing techniques and procedures, and sensor requirements, necessary to identify and monitor species composition, plant successional stages, and soil attributes on military ranges.
- ◆ Protocols for linking contemporary and emerging sensor data to ecological models.
- ◆ Vegetation maps for each study site.
- ◆ Data Base of contemporary/emerging high resolution imagery and ground data.
- ◆ Peer Reviewed Publications.
- ◆ Interim Report Contributions.

NOTE: Analysis procedures are to be developed using commercial-off-the-shelf software (e.g., ARCVIEW, ERDAS Imagine) and available on CD ROM.

 SERDP
Sustaining America's Energy Resources
Delivering Sustainable Solutions

DELIVERABLES (continued)

Retrospective Analysis

- ♦ Protocols for temporal change detection.
- ♦ Ecological Resilience/Behavior Models at critical thresholds of the ecosystem.
- ♦ Remote Sensing Techniques and Procedures necessary to identify and monitor ecosystem response and recovery on military ranges.
- ♦ Protocols for linking contemporary data to ecological models.
- ♦ Ecosystem Maps for each facility.
- ♦ Data base of contemporary imagery providing historical context.
- ♦ Enhanced Data Base of RFMSS, unit , and training information.
- ♦ Peer Reviewed Publications.
- ♦ Interim Report Contributions.

NOTE: Analysis procedures are to be developed using commercial-off-the-shelf software (e.g., ARCView, ERDAS Imagine) and available on CD ROM.

 SERDP
Sustaining America's Energy Resources
Delivering Sustainable Solutions

TRANSITION PLAN

- ♦ Spatial change detection will be demonstrated, validated, and documented both for improved input data to several ecological models and also for implementation at other installations at the completion of this effort.
- ♦ Temporal change detection and uncertainty analysis protocols will be demonstrated, validated, and documented for improving ecological understanding and modeling. Protocols will be applicable to other installations at the completion of this effort.
- ♦ Technology transfer will occur via scientific and technical literature, CD-ROM publication and distribution, and Internet sites prepared as a part of this study with specific information for each study location. See: www.gis.usu.edu/serdp and www.gis.usu.edu/mojave/emerging.htm
- ♦ Protocols are being incorporated into widely used off-the-shelf software (e.g., ESRI ArcView GIS; ERDAS Imagine image processing software).

PRESENTATION: LCTA Collaboration and Land Use Carrying Capacity.
PRESENTER: David Price and Terry McLendon.

LCTA Collaboration and Land Use Carrying Capacity

- Presenters - David Price, Terry McLendon, Mike Childress
- Partners - Elizabeth & Jim Kellogg, Dawn Lawson
- Marine Corps Air Ground Combat Center - Twentynine Palms, CA
- POC's - Paul 'Kip' Otis-Diehl, Jeff Foisy



US Army Corps
of Engineers

Engineer Research and Development Center

Objective

- Work with MCAGCC, TDS, and NAVFAC personnel to assess current LCTA protocol
- Team will determine improvements to LCTA based on MCAGCC goals and objectives
- Team will develop implementation plan
- SMI and CERL will use existing data to develop simulation model for carrying capacity (EDYS-TUDM)



US Army Corps
of Engineers

Engineer Research and Development Center

Context

- Initiation - LMS project team recommendation and formal memorandum of agreement between USACERL and MCAGCC
- Installation priorities - Collaboration on LCTA protocol and carrying capacity modeling, wind erosion modeling, and web-based map dissemination



US Army Corps
of Engineers

Engineer Research and Development Center

Final Product

- Product description - Dr. Terry McLendon, SMI
- Demonstration of working version - Dr. Mike Childress, SMI

 US Army Corps of Engineers

Engineer Research and Development Center

MCAGCC Twenty-Nine Palms EDYS Application Plant

Species

Trees/Shrubs	Grasses	Forbs
burroweed	cheatgrass	desert mallow
catclaw	fluffgrass	filaree
cholla	galleta	mare's tail
creosotebush	Indian ricegrass	pepperweed
desert willow	Mediterranean grass	plantain
Joshua tree	red threeawn	Russian thistle
mesquite	sixweeks grama	
prickly pear		
ratany		
saltcedar		
smoketree		

 US Army Corps of Engineers

Engineer Research and Development Center

MCAGCC Twenty-Nine Palms EDYS Application

Ecological Stressors	Management Scenarios
Fire	• Bivouacing/Staging
Insect/rodent herbivory	• Foot traffic
Interspecific competition	• Linear disturbances
Precipitation fluctuations	• Reseeding
Soil erosion/deposition	• Tracked vehicle traffic
Soil nitrogen availability	• Wheeled vehicle traffic

 US Army Corps of Engineers

Engineer Research and Development Center

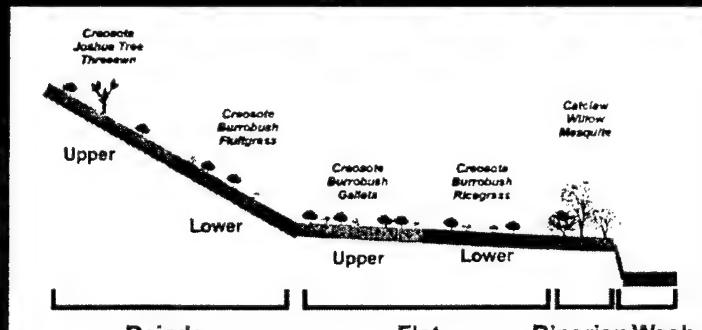
MCAGCC Twenty-Nine Palms EDYS Application

Community	Location	Impact
Creosotebush-yucca/treeawn	Upper bajada	Low
Creosotebush-cactus/cheatgrass	Upper bajada	High
Creosotebush-ratany/fluffgrass	Lower bajada	Low
Creosotebush-ratany/cheatgrass	Lower bajada	High
Creosotebush-burroweed/galleta	Upper flat	Low
Creosotebush- burroweed/Med grass	Upper flat	High
Creosotebush- burroweed/ricegrass	Lower flat	Low
Creosotebush- burroweed/Med grass	Lower flat	High
Catchaw-desert willow-mesquite	Riparian	Low
Catchaw-desert willow-saltcedar	Riparian	High

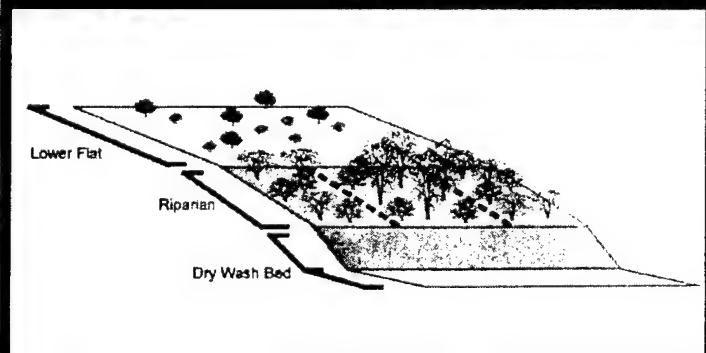


Engineer Research and Development Center

Twenty-Nine Palms MCAGCC / Mojave Desert Community Zone



Twenty-Nine Palms MCAGCC / Mojave Desert Lower Flat, Riparian, and Wash Areas



MCAGCC Twenty-Nine Palms EDYS Application

End Point Variables

- Productivity of desert tortoise food plants
- Productivity of each plant community
- Relative composition of native plants
 - overall and by species
- Relative composition of non-native plants
 - overall and by species
- Spatial extent of native plant communities
- Soil erosion
- topsoil loss and deposition
- Surface water export to and from dry wash



US Army Corps
of Engineers

Engineer Research and Development Center

Integration

- Dynamic link with the Training Use Distribution Model (TUDM) in progress
- Dynamic link with CASC2D model in progress
- Installation digital and tabular data, e.g., DEM, Vegetation, LCTA, Soils, TES/sensitive areas habitat
- Future link with Wind Erosion Models



US Army Corps
of Engineers

Engineer Research and Development Center

Project Schedule

Milestone	Status
Initial coordination	complete
LCTA execution plan	complete
Carrying Capacity model plan	complete
Contracts with SMI and TDS	complete
Present working Carrying Capacity	3Q FY00
Present LCTA recommendations	4Q FY00
Dynamic link EDYS/TUDM	2Q FY01
Final Carrying Capacity Model	3Q FY01



US Army Corps
of Engineers

Engineer Research and Development Center

Transition Planning

- What will be handed over?
 - Executable form of EDYS for simple landscape in designated TA - 3Q FY01
 - Workshop to train installation personnel in EDYS structure, data entry, re-parameterization, hands-on with various management scenarios - 3Q FY01
 - Recommendations for LCTA protocol and data analysis procedures - 4Q FY00

 US Army Corps
of Engineers

Engineer Research and Development Center

Impact on Installation Operations

- Capability - Objectively project and evaluate the impacts of potential or perceived conflicting land uses and management strategies
- Value - Facilitates stakeholder participation rather than divisive land use planning and management

 US Army Corps
of Engineers

Engineer Research and Development Center

Conclusion

- Case study completion - planned June 01
- Future needs - Implementation support and planning

 US Army Corps
of Engineers

Engineer Research and Development Center

5 MCAGCC LMS Military Field Application FY00 IPR Summary of Comments and Responses

During the workshop, each participant was asked to provide comments on specific projects, general direction of MCAGCC military demonstration, and future direction and/or prioritization of future projects. This chapter summarizes the comments provided by the workshop participants. Table 1 lists each comment, who provided the comment, and the LMS response to the comment. Along with the response, the person responsible for addressing the issue is provided.

Table 1. Workshop participant comments/questions and responses.

No.	Commenter	Comment/Question	Response
1	ERDC/CERL	Who is the new POC to replace Jeff Foisy?	Answer: Lorrie Agnew (MCAGCC)
2	MCAGCC	Request for information and recommendations on non-exotic, non-invasive vegetative wind breaks.	Accessing VegSpec at http://plants.usda.gov/ will allow you to select the appropriate native species for wind barriers. Will provide species list to MCAGCC. (CERL/Skidmore)
3	MCAGCC	What type of dust collectors and saltation device are recommended?	Passive dust collectors are recommended and SENSIT is recommended for saltation readings. (Skidmore)
4	Skidmore	Need micronet data from Phil Chambers.	Request will be forwarded to Chambers. (MCAGCC)
5	Shepard/Miller	Asked for EDYS input from MCAGCC and other users.	Take out cheatgrass. (MCAGCC) Add red brome and burr sage to the model. (Fort Irwin)
6	MCAGCC	MCAGCC wants to be sure that they are not paying for ERDC/CERL LMS projects. There is concern about the possibility of funds being mixed on several LCTA projects.	The current projects funded by ERDC/CERL and MCAGCC are distinct and separate. No funds have been mixed on either SOW. (Kellogg)
7	MCAGCC	Data structure follows Tri-Service CADD/GISTEC, currently looking at directory structure with report and data capabilities.	Concur. (Dilks)
8	MCAGCC	Integrated multimedia is a concern for getting information to the user and getting that to the management level in a user-friendly way.	Concur. (Dilks)

No.	Commenter	Comment/Question	Response
9	MCAGCC	Construction of web-based map dissemination to use for UXO applications, using objects programmer.	Concur. Will look into applicability. (Dilks)
10	Fort Irwin	Request for TUDM information.	TUDM report will be sent out to Fort Irwin. (Goran)
11	Fort Irwin	What is the status of RWEQ?	Wind erosion advisory group is currently working on RWEQ. Will forward request to Alan Anderson. (Skidmore/Gebhart)
12	MDEP	More information is needed on data repository, when will this be available?	Will advise. (Dilks)
13	Navy	How are plant shapes accounted for in the wind erosion models?	Concur. Plant shape effects on wind erosion are currently being studied. (Skidmore)

Appendix A: MCAGCC LMS IPR Letter of Invitation and List of Invitees

CEERD-CN-C (70-1s)

03 March 2000

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: FY00 In-Progress Review (IPR) for Mojave Desert (Twenty-nine Palms) Land Management System (LMS) Military Field Application Site, 13 April 2000, Palm Springs, California

1. The first IPR for the Mojave Desert Marine Corps Air Ground Combat Center (MCAGCC) LMS Military Field Application Site will be held at the Holiday Inn - Palm Mountain Resort, 155 South Belardo in Palm Springs, CA. This IPR is designed to provide participants with an opportunity to learn about and influence the projects underway or planned for the Mojave Desert region and MCAGCC related to LMS. We will also be discussing how MCAGCC and other interested installations will use the outcomes of these projects.
2. There will be an opportunity on Thursday for MCAGCC and other interested installation personnel to provide feedback on specific projects, relate information on the general direction of the MCAGCC military demo, and input to prioritize future LMS (and related) projects at MCAGCC. Other participating organizations will also have the opportunity to contribute their input.
3. For additional information on LMS, see the enclosed brochure and review the LMS website at <http://www.denix.osd.mil/LMS>.
4. A block of rooms has been reserved at the Holiday Inn - Palm Mountain Resort, 155 South Belardo. Rooms must be reserved by 13 March 2000 to ensure availability. Rooms are \$89.00 plus tax, to make your reservations contact (760) 325-1301. You must mention that you are taking part in the Twentynine Palms IPR meeting to receive this special rate. Further in-

formation regarding local restaurants and attractions can be found at <http://www.palmsprings.com>.

5. RSVP to Ms. Heidi Howard by Thursday, 06 April 2000 if you plan to attend this IPR. For questions concerning the IPR, please contact Ms. Heidi Howard at (217) 352-6511 ext. 7601, h-howard@cecer.army.mil. Ms. Howard is helping coordinate the IPR and can assist you with any issues.

Encl

WILLIAM D. GORAN
LMS Coordinator

CEERD-CN-C (70-1s)

SUBJECT: FY00 In-Progress Review (IPR) for Mojave Desert (Twenty-nine Palms) Land Management System (LMS) Military Field Application Site, 13 April 2000, Palm Springs, California

DISTRIBUTION:

Alan Anderson
John Barko
Pat Black
Mike Childress
Kelly Dilks
Clarence Everly
Jeff Foisy
Dick Gebhart
William Goran
Robert Holtz
Jeff Holland
Heidi Howard
Wayne Johnson
Bruce Jones
Liz Kellogg
Robert Koenigs
Richard Lawrence
Dawn Lawson
Ray Madden
Kim Majerous
Terry McLendon
Valerie Morrill
Dave Mouat
Jim Omans
Kip Otis-Diehl
David Price
Robert Riggins
Marilyn Ruiz
Ed Skidmore
Ruth Sparks
Scott Tweddale

CEERD-CN-C (70-1s)

SUBJECT: FY00 In-Progress Review (IPR) for Mojave Desert (Twentynine Palms) Land Management System (LMS) Military Field Application Site, 13 April 2000, Palm Springs, California

AGENDA

- 0800 IPR Opens at Holiday Inn Palm Mountain Resort
- 0815-0845 Overview LMS Introduction, Bill Goran
- 0845-0915 MCAGCC Introduction, Dick Gebhart
- 0915-1015 Web-based Map Dissemination, Kelly Dilks
- 1015-1030 Break
- 1030-1115 Wind Erosion, Ed Skidmore
- 1115-1200 Carrying Capacity, Dave Price
- 1200-1300 Lunch Break
- 1300-1330 LCTA/ITAM at MCAGCC, Liz Kellogg (tentative)
- 1330-1415 SERDP Remote Sensing, Scott Tweddle
- 1415-1500 SERDP Alternative Futures, Dave Mouat (tentative)
- 1500-1545 SERDP Arid Lands Restoration, Dick Gebhart
- 1545-1600 Break
- 1500-1600 Comment and Review
- 1600-1700 Plans for the Future

Appendix B: MCAGCC LMS IPR List of Attendees Information

MEMORANDUM FOR (LMS POC)

SUBJECT: FY00 In-Progress Review (IPR) Attendees List for Twenty-nine Palms Land Management System (LMS) Military Field Application Site, April 13, 2000, Palm Springs, California.

Lorrie Agnew
Mike Childress
Kelly Dilks
Clarence Everly
Jeff Foisy
Tom Frank
Dick Gebhart
William Goran
Heidi Howard
Liz Kellogg
Richard Lawrence
Dawn Lawson
Terry McLendon
Kip Otis-Diehl
Val Prehoda
David Price
Doug Ramsey
Ed Skidmore
Ruth Sparks
Paul Tueller
Scott Tweddale
Robert Washington-Allen

NAME	ORGANIZATION	ADDRESS	PHONE and EMAIL
Lorrie Agnew	MCAGCC	MCAGCC Box 788110 Attn: L. Agnew 29 Palms, CA 92278	(760) 830-7396 ext 244 agnewlr@29palms.usmc.mil
Mike Childress	Shepherd Miller Inc.	Shepherd Miller Inc. 3801 Automation Way, Suite 100 Fort Collins, CO 80525	(970) 223-9600 (970) 223-7171 mchildress@shepmill.com
Kelly Dilks	ERDC/CERL	ERDC/CERL PO Box 9005 Champaign, IL 61826	(217) 352-6511 k-dilks@cecer.army.mil
Clarence Everly	Mojave Desert Ecosystem Program	Mojave Desert Ecosystem Program 222 East Main Street Suite 216 Barstow, CA. 92311	(760) 255-8896 everlyc@mojavedata.gov
Jeff Foisy	Mojave Desert Ecosystem Program	Mojave Desert Ecosystem Program 222 East Main Street Suite 216 Barstow, CA. 92311	(760) 255-8895 foisyj@mojavedata.gov
Tom Frank	University of Illinois	University of Illinois 220 Davenport Urbana, IL 61801	(217) 333-7248 frank@gis.uiuc.edu
Dick Gebhart	ERDC/CERL	ERDC/CERL PO Box 9005 Champaign, IL 61826	(217) 352-6511 d-gebhart@cecer.army.mil
William Goran	ERDC/CERL	ERDC/CERL PO Box 9005 Champaign, IL 61826	(217) 352-6511 w-goran@cecer.army.mil
Heidi Howard	ERDC/CERL	ERDC/CERL PO Box 9005 Champaign, IL 61826	(217) 352-6511 h-howard@cecer.army.mil
Liz Kellogg	Tierra Data Systems	Tierra Data Systems 10110 West Lilac Escondido, CA 92026	(760)749-2247 liz@tierradata.com
Richard Lawrence	ESRI	ESRI 380 New York Street Redlands, CA 92373-8100	(909) 793-2853 ext 1700 rlawerence@esri.com
Dawn Lawson	Naval Facilities Eng.	Commander SW Naval Facilities Eng. Command (Dawn Lawson) 1220 Pacific Hwy. San Diego, CA 92132	(619) 532-3775 LawsonDM@efds.sw.navfac.navy.mil

Terry McLendon	Shepherd Miller Inc.	Shepherd Miller Inc. 3801 Automation Way, Suite 100 Fort Collins, CO 80525	(970) 223-9600 (970) 223-7171 mchildress@shepmill.com
Kip Otis-Diehl	MCAGCC	MCAGCC Box 788110 Attn: P. Otis-Diehl NREA 29 Palms, CA 92278	(760) 830-7396 ext 241 otisdiehlpk@29palms.usmc.mil
Val Prehoda	MCAGCC	MCAGCC Box 788110 Attn: V. Prehoda 29 Palms, CA 92278	(760) 830-7396 ext 238 prehodav@29palms.usmc.mil
David Price	ERDC/WES	ERDC/WES 909 Halls Ferry Road Vicksburg, MS 39180	(601) 634-4874 d-price@wes.army.mil
Doug Ramsey	Utah State University	Director, Remote Sensing/GIS Lab 9635 Ordmann Hill, USU Logan UT, 84322-9635	(435) 797-3783 dougr@cnr.usu.edu
Ed Skidmore	USDA-ARS	Kansas State University 1007B Throckmorton Hall Manhattan KS, 66506	(785) 532-6726 skidmore@ksu.edu
Ruth Sparks	Fort Irwin	Commander NTC and Fort Irwin AFZJ-PT PO Box 105100 ATTN: ITAM Office (Sparks) Fort Irwin, CA 92310-5100	(760) 380-5903 sparksr@irwin.army.mil
Paul Tueller	UNR	Dept Environmental & Resource Science University of Nevada Reno 1000 Valley Road Reno, NV 89512	(775) 784-4053 ptt@equinox.unr.edu
Scott Tweddale	ERDC/CERL	ERDC/CERL PO Box 9005 Champaign, IL 61826	(217) 352-6511 s-tweddale@cecer.army.mil
Robert Washington-Allen	Oakridge	ORNL P.O. Box 2008, M56407, Bldg 1507 Oak Ridge, TN 37831-6407	(865) 241-5159 obq@ornl.gov

Distribution

Chief of Engineers
ATTN: CEHEC-IM-LH (2)
ATTN: HECSA Mailroom (2)
ATTN: CECC-R
ATTN: CERD-Z

Engineer Research and Development Center (Libraries)
ATTN: ERDC, Vicksburg, MS
ATTN: Cold Regions Research, Hanover, NH
ATTN: Topographic Engineering Center, Alexandria, VA

Defense Tech Info Center 22304
ATTN: DTIC-O (2)

Marine Corps Air Ground Combat Center
LMS IPR Attendees (20)

31
5/00

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.

1. REPORT DATE (DD-MM-YYYY) 11-2000			2. REPORT TYPE Final			3. DATES COVERED (From - To)		
4. TITLE AND SUBTITLE Marine Corps Air Ground Combat Center (MCAGCC) Land Management System (LMS) Military Field Application Site FY00 In-Progress Review			5a. CONTRACT NUMBER					
			5b. GRANT NUMBER					
			5c. PROGRAM ELEMENT NUMBER					
6. AUTHOR(S) Heidi Howard, Dick Gebhart, and William Goran			5d. PROJECT NUMBER 62720A917					
			5e. TASK NUMBER					
			5f. WORK UNIT NUMBER					
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) U.S. Army Construction Engineering Research Laboratory (CERL) P.O. Box 9005 Champaign, IL 61826-9005			8. PERFORMING ORGANIZATION REPORT NUMBER ERDC/CERL TR-00-35					
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) U.S. Army Corps of Engineers 20 Massachusetts Ave. N.W. Washington, DC 20314-1000			10. SPONSOR/MONITOR'S ACRONYM(S) CERD-ZA					
			11. SPONSOR/MONITOR'S REPORT NUMBER(S)					
12. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release; distribution is unlimited.								
13. SUPPLEMENTARY NOTES Copies are available from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161.								
14. ABSTRACT The Land Management System (LMS) is an initiative of the U.S. Army Corps of Engineers (USACE) Engineer Research and Development Center (ERDC) focused on improving landscape analysis and landscape management capabilities in several of the Corps of Engineers major mission areas. The purpose of LMS is to provide relevant science, tools, and information to land and water resource managers and decisionmakers with the goal of enhancing their ability to understand and communicate past, current, and potential impacts of management actions on land and water resources. In 1999, the Marine Corps Air Ground Combat Center (MCAGCC) at Twentynine Palms, CA, was officially designated as a field application site. Field Application Site In-Progress Reviews (IPRs) are designed to ensure that the stages of evaluation, modification, and documentation are fulfilled. The first IPR workshop was held 13 April 2000. The objectives of this IPR were to provide a forum where personnel involved with specific MCAGCC LMS projects could discuss the progress of each effort, identify the relationships between projects, and solicit input from potential users of the resulting products. Results of the IPR are documented in this report to ensure project improvements and adjustments occur and to assist with the next IPR.								
15. SUBJECT TERMS Land Management Systems (LMS), Marine Corps Air Ground Combat Center (MCAGCC), military land management, in-progress review (IPR)								
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT		18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON Dick Gebhart		
a. REPORT Unclassified	b. ABSTRACT Unclassified	c. THIS PAGE Unclassified	SAR		84	19b. TELEPHONE NUMBER (include area code) (217) 352-6511, X-6391		